Samsung SpinPoint F1 1TB | **Alienware Area-51 m15x** | **Zalman ZM1000-HP**

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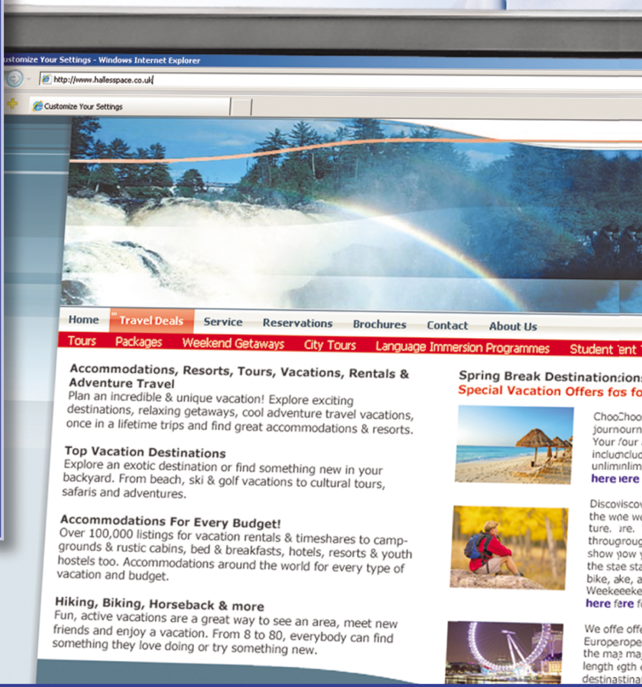

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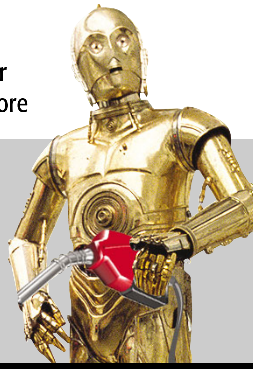

Editor's Note

Nostalgia. Like lots of things in life, it's a bigger deal to some than to others, and the objects and events we look back on with fondness are every bit as unique from one person to the next as are the things we like today. Factor in varying ages, origins, and belief systems, and it can be very difficult to predict what will trigger a sentimental mood in just about anyone.

Some objects, though, just seem to resonate more than others; these items create unseen bonds between people by virtue of shared experience to the extent that they become symbols of a particular era or event.

I would suggest to you that the TRS-80 is just such a thing. Ask anyone who was passionate about computers in the late '70s and early '80s, and he can probably tell you stories of happy (and, likely, not-so-happy) hours spent tinkering with Tandy's two-tone personal computer. For some, the TRS-80 was the logical next step in a lifelong obsession that made personal computing a practical reality. For others, like me, it was one of the first machines, along with the Sinclair ZX80 and Commodore's VIC-20 and C64, to ignite imagination and show a glimpse of the power that computing could hold.

It's often the case that *things* we remember so fondly from our pasts seem primitive and limited when seen in the harsh light of modern comparison, and in the end the same is true of the TRS-80. These days, no reasonable person would voluntarily subject himself to an 8-bit computer with 4KB of RAM and a cassette tape player for storage. But seeing one stirs up a wealth of memories that intensify as time passes, even as the machine itself is ravaged by that same relentless march.

If you looked at this month's cover and felt the same way I did when I first caught sight of our cover mod at PDXLAN 11, you know exactly what I mean, and I invite you to turn to page 44 at your earliest convenience and revel in the moment a bit more. If, on the other hand, the TRS-80 was before your time and you've decided I'm a gibbering lunatic, I can only tell you that one day down the road you *will* feel this way about something or other. Enjoy.

Chris Trumble, Publication Editor, *CPU*

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Compiled by Blaine Flamig

Tasty Tunes Without An Apple Aftertaste

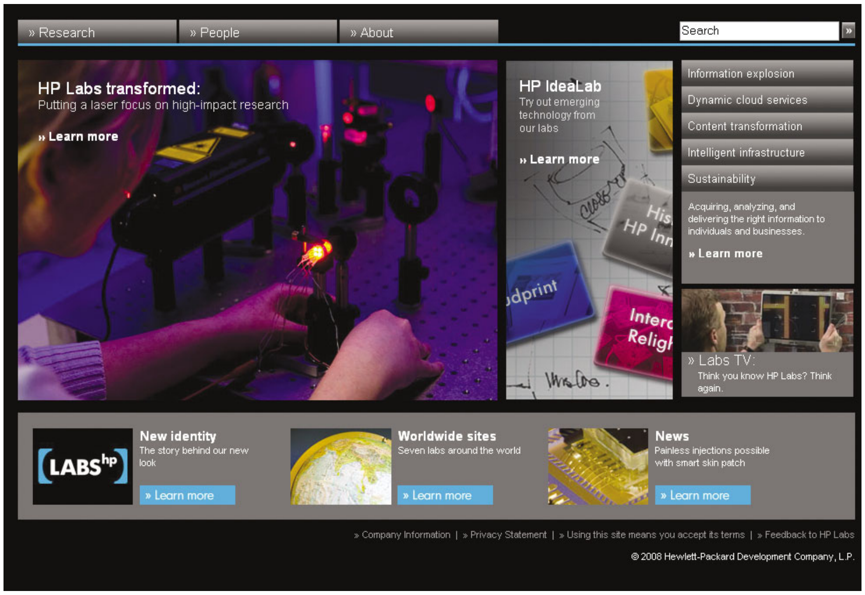
If we kept a list of digital audio players we'd like to nibble that don't taste like Apple, we'd add the iRiver E100 ($89.99 to $159.99; 2/4/8GB) and Cowon A3. The E100 was still awaiting release at press time, but expect five color choices, native FLAC support, built-in stereo speakers, 30fps video on a 2.4-inch screen, FM and line-in recording, and a microSD slot. Cowon's A3, a 30GB ($329.99) or 60GB ($389.99) AV monster, supports FLAC, MP3, WMA, OGG Vorbis, and other formats, and has a 4-inch, 800 x 480 screen that plays 1,280 x 720 HD files without transcoding. You also get integrated stereo speakers, composite in/out, S-Video jack, and USB 2.0 port. Wi-Fi is missing, but there's voice recording, a 10-band equalizer, audio and video recording, and mucho other goodies. ▲

Ripfactory's Rip-Roaring Ripper

Beyond looking way cool, the Ripserver—a "NAS device with fully integrated CD-ripping engine"—serves a way cool purpose: performing high-quality CD conversions without the normal fuss and no peripherals required. Just plug this UPnP-supporting, Linux-based cube into your network (Macs and PCs supported), configure it via your Web browser interface, and it will automatically rip and store 500GB ($849; 125,000 songs) or 1TB ($995; 250,000 songs) of FLAC or MP3 music with metadata via Ripfactory's proprietary software. TwonkyMedia and SlimServer are included, as is RAID 1 protection and a USB port. You've been served. ▲

HP Labs To Do Less Exploring

Typical buyers know HP best for its printers, notebooks, desktops, and maybe even former CEO Carly Fiorina. Geeks know HP best for its storied history of R&D—more than 40 years, in fact, to the tune of 23 labs in seven countries with a staff numbering about 600. In a nod toward catching the eye of more typical buyers, CEO Mark Hurd announced in March that HP will curtail the 150 or so projects it typically has in the works, to 20 to 30 in five major focus areas. Hurd also says HP Labs will seek stronger bonds with universities, VCs, government agencies, and buyers to pull out those projects with promise and develop methods to turn patents into quicker profits. Reportedly, HP was 10th on the 2007 patent-granted list with 1,470, well behind No. 1 IBM's top 3,148 patents granted. ▲



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Want A Cold One With Your Frags?

Want to be the most popular fragger on the LAN party block? Get your hands on a Heineken BeerTender ($299.95), recently made available in the United States. While you and the fellow sharpshooters frag away, the BeerTender's Peltier cooling system will keep the suds cool at your choice of three preset temperature settings until you can pull another draw from the built-in tap. All you need to supply is a 5-liter Draught-Keg, which uses a touch of C02 technology to keep the suds OK for sipping up to 30 days. Better, an LCD always tells you how much beer remains and how long it will keep its freshness. ▲

Hardware Mole

HD DVD, It Was Nice Knowing You?

To catch up: Toshiba has turned its back on HD DVD, the major movie studios are all now Blu, and there's seemingly a new development every day now—or rumor of one. In early March alone, Apple was rumored to be planning Blu-ray drives for Macs (and supposedly wanted them in the recent MacBook Pro). Microsoft had cut Xbox 360 HD DVD drives to under $50 and was rumored to be talking with Sony about integrating Blu-ray drives in the console. Circuit City had instructed stores to "take care of its customers" and give those who recently purchased HD DVD players 90 days to return them for store credit vs. the normal 30-day period. Finally, Samsung decided against releasing the combo BD-UP5500 Duo HD Player (UP5000 pictured) it showed at CES. ▲

Makes Friends With A "Windows Companion"

If reports concerning Microsoft's StartKey project for emerging and developing markets are true, we'll soon be able to tote our Windows and Windows Live settings on flash drives and securely reproduce our individual Windows environments on Windows-based PCs away from home. A StartKey drive would give you your own wallpaper, software, desktop icons, contacts, music, video, photos, passwords, and various settings reportedly, but not actual OS data. StartKey roots apparently stem from a partnership Microsoft planted with SanDisk last year to replace U3 Smart Technology on SanDisk's flash drives. Look for StartKey betas later this year. ▲

Salmosa: One Speedy Mouse

Razer strung us along for days in February with mysterious footage on a company mini-site (speedofthelight.com/minisite) promoting its new Salmosa gaming mouse. Though the fiendishly quick video moved too fast to make out what the Salmosa exactly was, Razer eventually put on the brakes and revealed "the quickest entry-level gaming-grade mouse armed with the fastest tracking optical sensor in the world." Specifics on the ambidextrous Salmosa include 1,800dpi precision via 3G infrared sensor, 1ms response time, On-The-Fly Sensitivity adjustment, 24 click positions on the scroll wheel, and three configurable HypeResponse buttons. The speedster clocks in at around $40. ▲

Compiled by Dean Takahashi

New Embedded Memory Technology For Low-Power Devices

Novelics, a chip start-up in Aliso Viejo, Calif., says that it can cut the size of embedded Static Random Access Memory (SRAM) inside the newest system chips. By cutting the size of the one-transistor SRAM memory in system chips by 20% percent, the company says it can reduce costs, cut power consumption, and enable new kinds of consumer electronics products. Moreover, Cyrus Afgahi, CEO of Novelics, says that customers can use a standard CMOS manufacturing process to make their chips, allowing the SRAM memory in a system to match the high-performance technology in the rest of the chip.

The company is partnering with Synopsys, which will offer customers the Novelics technology along with its design tools. The 40-employee Novelics has been working on the technology for three years. ▲

MetaRAM Aims To Reduce Multicore Server Cost

Fred Weber helped conceive the Opteron chips that made Advanced Micro Devices competitive with Intel in the server market. Now Weber's new start-up, MetaRAM, has created a chipset that can quadruple the memory capacity in a server and cut its costs as much as 90% percent. Weber says the DDR2 MetaSDRAM solution closes the gap between memory performance and processor speed in Intel and AMD servers. With DDR2 MetaSDRAM, a server with 16 cores on four processors can store 256 gigabytes of memory and cost only $50,000. Normally, such a system costs more than $500,000. MetaRAM can do this because it enables more memory chips to be stacked atop each other on a standard memory module. There is no need for changes in hardware or software because MetaRAM essentially tricks the memory controller in the system into believing that there is more memory available. Weber says the technology advances memory technology by two to four years. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

CPU	Released	Original price	Last month's price	Current price
AMD Athlon 64 X2 Dual-Core 6000+ AM2 only	2/20/2007	$464**	$159	$158
AMD Athlon 64 X2 Dual-Core 6400+ AM2 only	8/20/2007	$251**	$169	$159
AMD Athlon 64 FX-70	11/30/2006	$599/pair	$217	$325
AMD Athlon 64 FX-74	11/30/2006	$999/pair	$327	$319
AMD Phenom 9500	11/19/2007	$251	$199	$209
AMD Phenom 9600	11/19/2007	$283	$219	$224
AMD Phenom 9600 Black Edition	12/23/2007	$251	$229	$239
Intel Core 2 Duo E6540	7/16/2007	$163**	$174	$170
Intel Core 2 Duo E6550	7/16/2007	$163**	$152	$168
Intel Core 2 Duo E6600 2.4GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$316**	$199	$199
Intel Core 2 Duo E6700 2.66GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$530**	$299	$327
Intel Core 2 Duo E6750	7/16/2007	$183**	$196	$189
Intel Core 2 Duo E6850	7/16/2007	$266**	$249	$274
Intel Core 2 Duo E8190 45nm	1/7/2008	$163**	$163**	$163**
Intel Core 2 Duo E8200 45nm	1/7/2008	$163**	$294	$163**
Intel Core 2 Duo E8400 45nm	1/7/2008	$183**	$255	$183**
Intel Core 2 Duo E8500 45nm	1/7/2008	$266**	$450	$266**
Intel Core 2 Quad X6800 2.93GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$999**	$1,029	$1,036
Intel Core 2 Quad Q6600	1/8/2007	$851**	$264	$274
Intel Core 2 Quad Q6700	7/16/2007	$530**	$539	$479
Intel Core 2 Quad Q9300 45nm	1/7/2008	$266**	$266**	$266**
Intel Core 2 Quad Q9450 45nm	1/7/2008	$316**	$316**	$316**
Intel Core 2 Quad Q9550 45nm	1/7/2008	$530**	$530**	$530**
Intel Core 2 Extreme QX6700	11/14/2006	$999**	$779	$695
Intel Core 2 Extreme QX6800	7/16/2007	$999**	$1,029	$1,036
Intel Core 2 Extreme QX6850 3.0GHz 8MB cache 1,333MHz FSB 65nm	7/16/2007	$999**	$979	$975

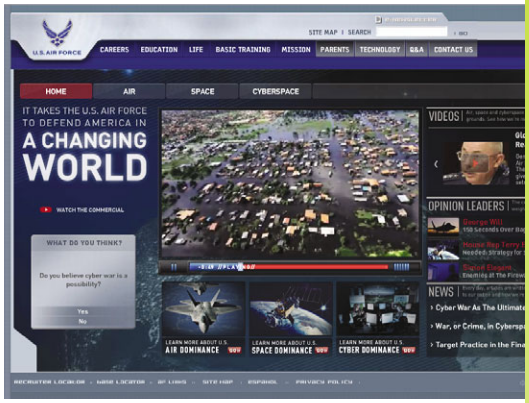
Magma-Sabio Combination Working To Automate Chip Design

Tools for making digital chips have been automated for a long time. But analog chip design is a black art. Experts have to painstakingly craft the circuitry in an analog system because of the finicky nature of wave-like analog circuitry. Automating this process has been the goal of Sabio Labs, a startup recently acquired by Magma Design Automation for $17.5 million, plus $7.5 million in contingent fees. Sabio can automate the process so that a company can move the manufacturing of an analog chip from one factory to another without a complete redesign, as is required today. It can also move the analog chip through the miniaturization process from one node to another, such as moving from 130nm manufacturing to 90nms. That saves considerably on design costs said Ashutosh Mauskar, vice president of business development at Magma. ▲

Compiled by Blaine Flamig

Air Force No-Nos Millions Of Blogs

The U.S. Air Force apparently isn't a big fan of blogs. Reportedly, the Air Force's Cyber Command, which oversees the Air Force Network Operations Center, has put filters in place that block personnel from accessing millions of independent Web sites with the word "blog" in the URL while they're on the job, citing issues of credibility, security, and productivity. Although "established" and "reputable" media outlets are OK, less-established sites with material judged less credible aren't. Blogs based on Blogger or Word Press are evidently taking the biggest hit. As for the policy, Tech. Sgt. Christopher DeWitt was quoted, "Often, we block first and then review exceptions." ▲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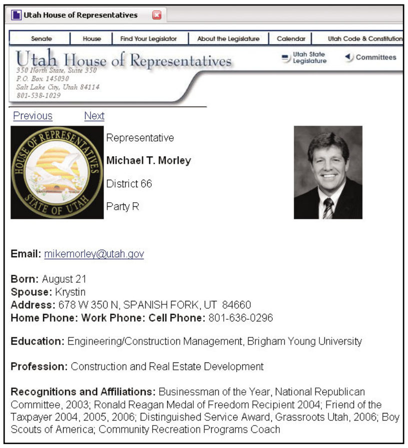
Toe The Company Line Or Else

Word of warning, fellow workers: Keep it clean. According to a survey of 304 U.S. companies from the American Management Association and ePolicy Institute, about one-third say they've canned workers for misusing the Internet. About a quarter have fired workers for misusing company email. Specific reasons for handing out walking papers included employees uploading inappropriate/offensive content (84%), violating company policies (48%), and excessive personal use (34%). Results indicate 66% of companies monitor Internet use, with 65% using site-blocking software, including for game sites (61%) and external blogs (18%). More alarming is that 45% of the companies report tracking content, keystrokes, and keyboard time, and 43% store and review computer files. ▲

Utah Considers G-Rated ISPs

On one hand, a bill that Utah Rep. Michael Morley introduced in that state's House of Representatives in February seems a godsend for parents with children poking around the Internet's dark corners. On the other, will any ISP want the responsibility Morley's bill would require? Reportedly, the bill would slap a CCIP (Community Conscious Internet Provider) tag on ISPs willing to prevent subscribers from posting content deemed harmful to minors, including pornography. Fair enough. The bill would also, however, require ISPs to track subscribers' IPs for at least 24 months after their initial allotment and give up identities of those that law enforcement suspects of illegal posts. ISPs would also have to handle complaints of objectionable content and face up to $10,000 in fines if offending posts squeak through. ▲



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P.O. Box 145030
Salt Lake City, Utah 84114
801-538-1029

Previous Next

Representative
Michael T. Morley
District 66
Party R

Email: mikemorley@utah.gov

Born: August 21
Spouse: Krystin
Address: 678 W 350 N, SPANISH FORK, UT 84660
Home Phone: Work Phone: Cell Phone: 801-636-0296

Education: Engineering/Construction Management, Brigham Young University

Profession: Construction and Real Estate Development

Recognitions and Affiliations: Businessman of the Year, National Republican Committee, 2003; Ronald Reagan Medal of Freedom Recipient 2004; Friend of the Taxpayer 2004, 2005, 2006; Distinguished Service Award, Grassroots Utah, 2006; Boy Scouts of America; Community Recreation Programs Coach

Site Seeing

Kluster Reconstructs Social Networking

Although just 21, Ben Kaufman is giving social networking a serious kick in the pants with Kluster, unleashed at February's TED conference. Over 72 hours, TED attendees and online users collaborated using Kluster to craft ideas for a new product. After settling on one, they created a prototype of Over There, a board game promoting cultural awareness. Kaufman, who started iPod-accessory company Mophie at 18, did something similar at Macworld 2007, asking attendees to submit accessory ideas, which 30,000 people voted on. Kaufman's team then constructed the Bevy in 72 hours, eventually selling 40,000 units in 28 countries. Kaufman has since sold Mophie to fund Kluster, which gives users "watts," a virtual currency used to invest in user ideas or projects companies submit for Kluster members to create, such as a new product, logo, or corporate event. Make it big, and watts turn into real dollars. ▲

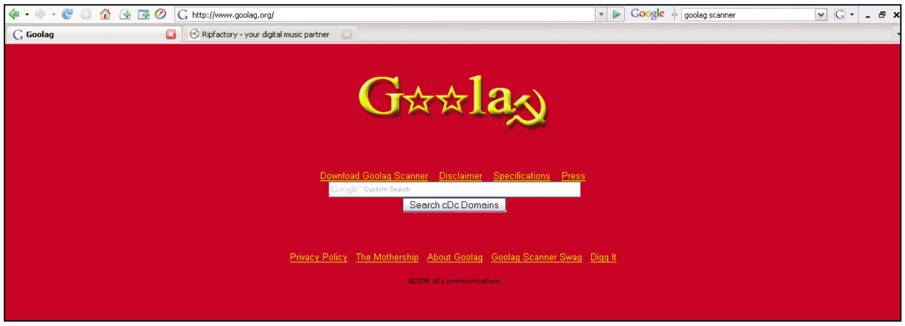
Find Free Shipping On The Cheap

If you're like us, paying for shipping after plunking down for an online purchase is roughly equivalent to moisturizing with thermal paste after a close shave. Freeshippingon.com aims to relieve the pain. The site's home page includes tabs specific to Amazon.com and eBay for searching each site for goods that sell with free shipping included. A third Free Shipping Coupons tab has access to 500-plus more stores. Additionally, tags at the page's bottom take you directly to stores falling in such categories as accessories, computers, travel, video games, food, software, and electronics. Actual stores Freeshippingon.com covers include OfficeMax, Best Buy, Staples, Dell, Buy.com, HP, Apple, Toshiba, and Adidas. ▲

Compiled by Blaine Flamig

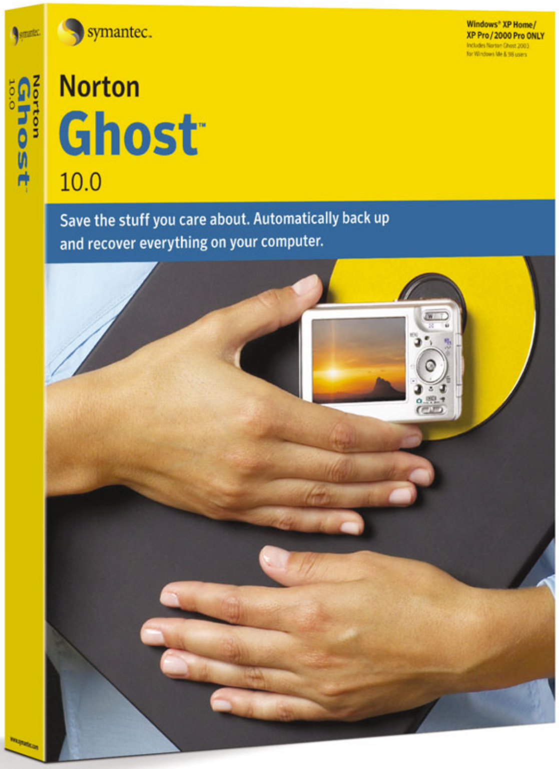
Goolag Scanner Takes Aim At Web Site

Chalk one up for the Cult of the Dead Cow. In February, the hacker group released a Google-like Web-auditing tool to let Web site owners check their sites for vulnerabilities. The open-source Goolag Scanner uses group member's "Johnny I Hack Stuff's" "Google-hacking" technique, adding a Windows-flavored GUI to simplify matters. Cult of the Dead Cow spokesman "Oxblood Ruffin'" stated, "It's no big secret that the Web is the platform. This platform pretty much sucks from a security perspective. Goolag Scanner provides one more tool for Web site owners to patch up their online properties." Ruffin' went on, "We've seen some pretty scary holes through random tests with the scanner. . . . If I was a government, a large corporation, or anyone with a large Web site, I'd be downloading this beast and aiming it at my site yesterday." ▲



Woomail Shoos Away Spam

Meet John Halloran, a precious metals dealer from Puerto Rico and the man behind the free email-protecting Woomail ("The World Safest Mail"), billed as "a new form of electronic messaging that will replace email as the (*sub*) standard." Halloran reportedly crafted the application after his daughter received unsavory spam. The Web-based software gives users a closed environment via one send/receive server that controls all phases of inbound/outbound mail; thus, communications aren't available in cyberspace. Woo to Woo Messages available between two Woomail users are touted as 100% spam-free, prescanned for viruses, and insured up to $250,000. ▲


symantec.
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Ghost
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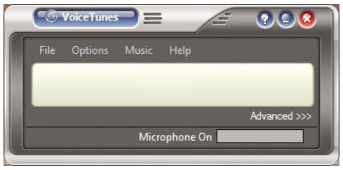
Windows XP Home/ XP Pro/2000 Pro ONLY

Pirates Are Productive. Who Knew?

According to the Software Information Industry Association's 2007 list of most pirated software, productivity apps are what pirates pilfer the most. According to the list, Symantec in particular took a whacking. The company's Norton AntiVirus, pcAnywhere, and Norton Ghost all made the list. Adobe was also an unfortunate loser, charting its Acrobat, Photoshop, Dreamweaver, and Creative Suite titles. Other chart toppers included Roxio Easy CD/DVD Creator and Toast Titanium, Nero Ultra Edition, McAfee VirusCan, Intuit TurboTax and Quicken Home and Business Editions, and Ipswitch WS_FTP. ▲

Software Shorts

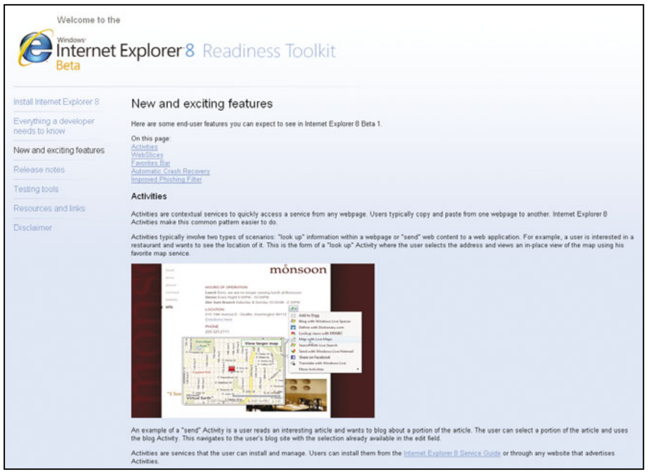
One Voice Technologies Brings The Noise



"iTunes, proceed to blow my mind—Sabbath-style." OK, Voice Tunes ($29.95) won't vocally kickstart in your iTunes or Windows Media Player libraries with as much flair, but the app's "just say it to play it" approach is still cool. Voice Tunes requires no voice training and will play tracks via artist, genre, album, and playlist vocal commands. Thus, a simple "Play Black Sabbath" or "Play Workout Playlist" will suffice. If you're not convinced the Windows XP/Vista Voice Tunes can possibly be so easy, a free five-day trial is a download away. You only need to supply a "quality" microphone. ▲

IE8 Goes Beta—Officially

Microsoft turned a developers' release of IE8 loose in early March with such new features as Activities and WebSlices, but sporting an appearance not far from IE7's. Activities gives you third-party services (Translate, Map, Send, Find, etc.) without leaving a current page, while WebSlices is a feature for Web sites to "connect to their users by subscribing to content directly within a Web page," giving users feed-like updates and notifications. Upon subscribing to a WebSlice, IE puts a link in Favorites, notifying you of updates previewed from the Favorites bar. Other IE8 features include Automatic Crash Recovery and Emulate IE7, which fools sites coded for IE7 to run IE8. ▲


Welcome to the
Windows Internet Explorer 8 Readiness Toolkit
Beta
Install Internet Explorer 8
Everything a developer needs to know
New and exciting features
Release notes
Testing tools
Resources and links
Disclaimer
mónsoon

New and exciting features

Here are some end-user features you can expect to see in Internet Explorer 8 Beta 1.

On this page:
Activities
WebSlices
Favorites Bar
Automatic Crash Recovery
Improved Phishing Filter

Activities

Activities are contextual services to quickly access a service from any webpage. Users typically copy and paste from one webpage to another. Internet Explorer 8 Activities make this common pattern easier to do.

Activities typically involve two types of scenarios: "look up" information within a webpage or "send" web content to a web application. For example, a user is interested in a restaurant and wants to see the location of it. This is the form of a "look up" Activity where the user selects the address and views an in-place view of the map using his favorite map service.

An example of a "send" Activity is a user reads an interesting article and wants to blog about a portion of the article. The user can select a portion of the article and uses the blog Activity. This navigates to the user's blog site with the selection already available in the edit field.

Activities are services that the user can install and manage. Users can install them from the Internet Explorer 8 Service Guide or through any website that advertises Activities.

Let It Be: The Beatles Finally On iTunes?

Strike up iTunes on your desktops, Beatles fanatics. The wait finally appears over for fans of the lads from Liverpool to purchase their tracks from iTunes. The move would end what has by far been the most important holdout of a band from turning its song catalog over to iTunes. According to early March reports from several London newspapers, Paul McCartney reached an agreement with Steve Jobs and company to put the Fab Four's tunes on iTunes "within months" at a cost to Apple of about $400 million or so. For its part, however, Apple said the rumors were "unsubstantiated speculation."

BIOS Upgrades Available Online

Compiled by Steve Smith

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new lease on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpumar08/bios to see our entire upgrade list.

Motherboard	Date Available	URL
Abit AX78 12	1/17/08	www.uabit.com/downloads/downloads.php?file=ftp://ftp-usa.abit.com.tw/pub/download/bios/ax78//m706a12.zip
ASRock 4Core133-FullHD 1.70	2/26/08	download.asrock.com/bios/775/4Core1333-FullHD(1.70).zip
Asus M2N-SLI 0601	2/25/08	dlsvr03.asus.com/pub/ASUS/mb/socketAM2/M2N-SLI/0601.zip
Asus P5N-T Deluxe 0802	2/05/08	dlsvr03.asus.com/pub/ASUS/mb/socket775/P5N-T_Deluxe/P5NTDeluxe0802.zip
BioStar A690G M2+ 219	2/26/08	www.biostar.com.tw/upload/Bios/A69GM219.BSC
Gigabyte GA-P35-DS3P (Rev. 1.1) F9	1/02/08	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-p35-ds3p_f9.exe
MSI P35 Neo2 1.8	2/05/08	download1.msi.com.tw/files/downloads/bos_exe/7345v18.zip

DIGITAL ECONOMY

Compiled by Steve Smith

The Job Search

Play the house odds. As every smart gambler knows, the only true winner in any casino is, well, the casino. With Bally Technologies, maker of slot machines and other gambling machines, you can go to Vegas and always play for the winning team. The company is looking for a math whiz to work as a Game Developer. With a degree in mathematics or engineering, and basic C++ programming skills, you will create the mathematical models that calculate "payback percentages" and "hit frequencies" for the vast range of electronic gambling devices Bally makes. Expect to bring to the green felt table proficiency in probability and statistics, and be ready to simulate gambling machine scenarios. Your job is not just to make games hard to win, but entertaining and enticing enough to bring gamblers back. According to Bally, the Game Developer creates "fun, innovative math models for optimal player appeal." We guess this means they want gamblers to win just enough to stay and play, but not enough to raise the ire of casino managers. And we don't want those guys getting mad.

http://tinyurl.com/2hjyyf

43% Percent of online buyers who frequently seek out customer reviews before purchasing a product. www.emarketer.com

3.4 MILLION NUMBER OF IDENTITY THEFT VICTIMS IN THE UNITED STATES IN 2007. WWW.JAVELINSTRATEGY.COM

26.9% SHARE OF ALL ONLINE SALES THAT OCCUR BETWEEN NOON AND 3 P.M. EACH DAY. WWW.CLICKZ.COM

42% RISE IN Q4 2007 AMAZON.COM SALES OVER SAME PERIOD IN 2006. WWW.LATIMES.COM

Follow the Money . . . & The Banner Ads

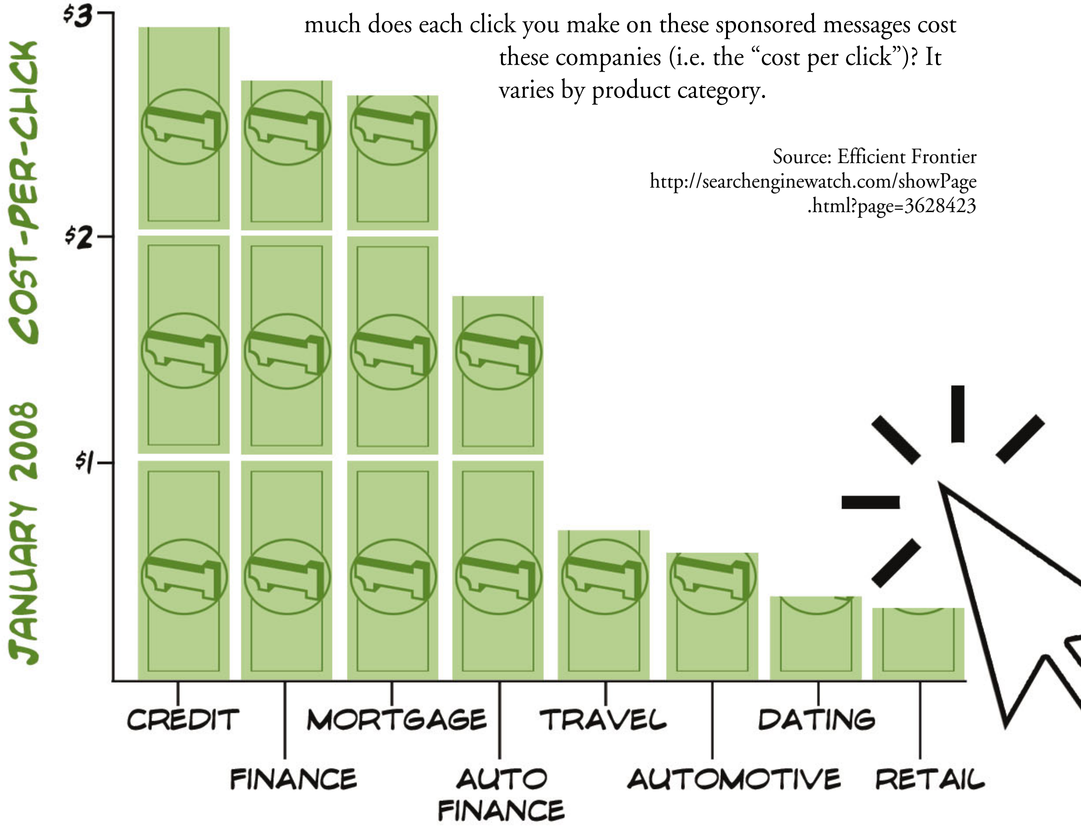
Political contributions buy TV ad spots, but as more candidates depend upon online contributions, they also invest in Web advertising to get them. Leading to his own record-breaking January of Web fundraising, Barack Obama purchased over 70 million banner ad impressions that clicked through to the candidate's Web site. John McCain brought his TV advertising to the Web, with approximately 19 million ads that pushed users to his video spot. According to Nielsen Online's AdRelevance, which monitors the online ad market, the biggest winner so far this election is Yahoo!, which consistently grabs a majority of the political banner ad impressions across its properties.

www.clickz.com/showPage.html?page=3628505

How Much Is That Search Ad In The Window?

Advertisers who use Google, Yahoo!, and MSN search engines pay those companies every time a user clicks one of the text ads in the search results. But how much does each click you make on these sponsored messages cost these companies (i.e. the "cost per click")? It varies by product category.

Source: Efficient Frontier
http://searchenginewatch.com/showPage.html?page=3628423



[FROM THE CORSAIR LAB]

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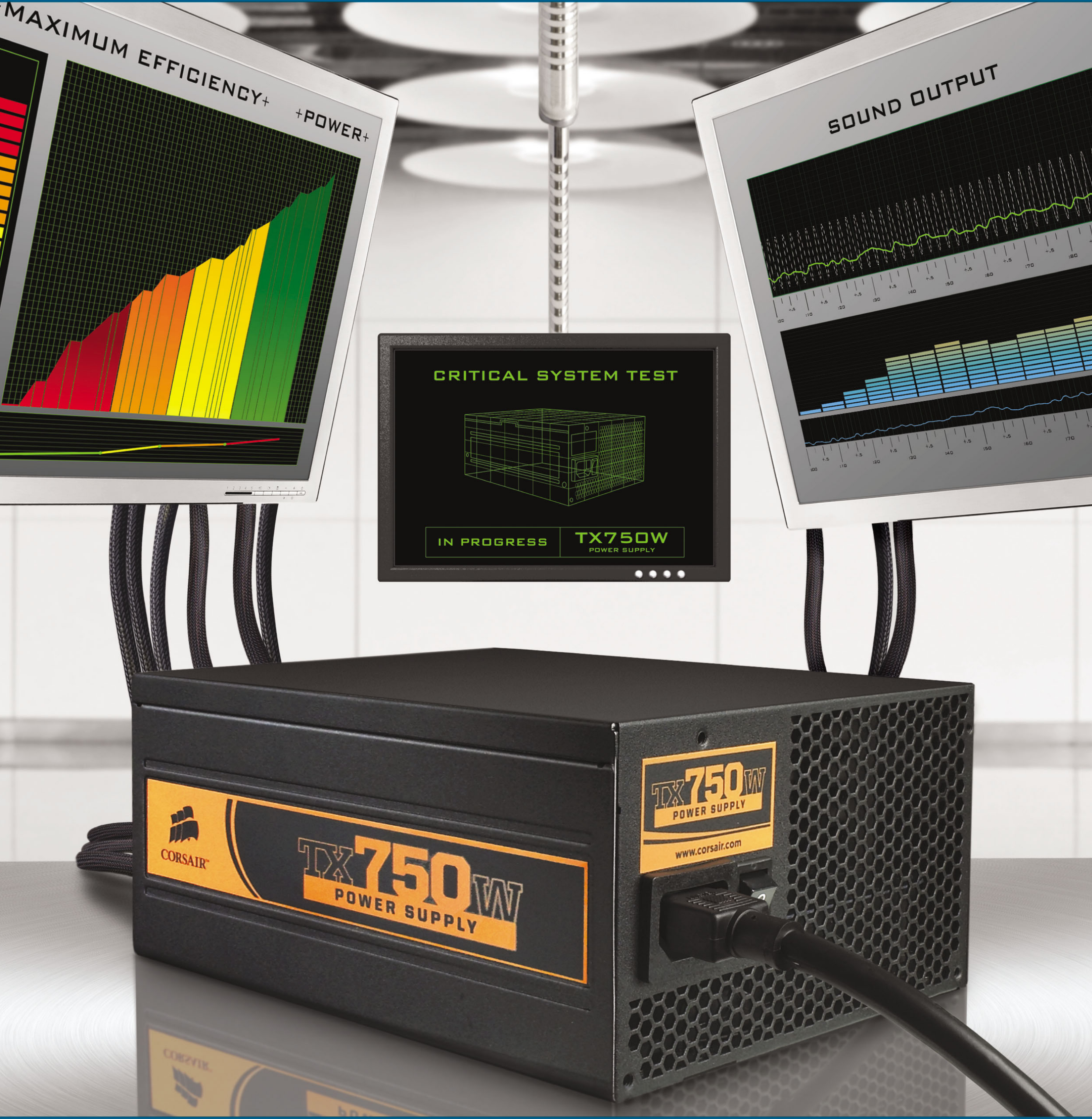

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by Alex St. John

Fake 3D

Back when I was a young nerd with an intense interest in the use of computers for simulating physical phenomena, I used to attend SIGGRAPH conferences to learn the latest computing techniques being pioneered in 3D graphics. This was in the late 1980s when SIGGRAPH was mostly a venue for academics. In that era, we had a pretty good understanding of the physics of light, but a poor understanding of what parts of the enormous computations required to produce realistic 3D rendered scenes were absolutely necessary to creating realistic 3D and which parts could be discarded or skipped with little impact on the realism of the end result. The only thing that was absolutely clear then was that we were a very long way from the computing power necessary to accurately simulate the real physics of light, to say nothing of doing it in real time. The most popular technique at the time was ray tracing, which closely approximated a real simulation of light physics and could produce stunningly realistic results. Although very powerful, ray tracing was extremely computation-intensive, requiring many hours or even days to produce a compelling result.

Items rendered in real time vs. simialar ray-traced items. (Ray-traced car photo courtesy of 3D HDRiMAGING ARTVPS Ltd., location photography by Nigel Harniman.)

Years later, the expertise in graphics that resulted from those early academic years of discovery was distilled down to a bag of clever tricks that could produce realistic-looking 3D results while skipping the heavy computing task of actual light physics simulation. These "tricks" were more computation-friendly, and although they did not produce the same "realistic" results that better light simulation achieved, they were fast and inexpensive to produce. During the time I worked for Microsoft on gaming, 3D rendering was still confined to the realm of expensive SGI workstations, Hollywood movie effects, and CAD/CAM applications. Microsoft had an OpenGL license from SGI to enable these kinds of high-end 3D applications on Windows NT but had no intention of trying to bring that technology down to a consumer OS like Windows 95.

> The problem with using Hollywood movie techniques to create realistic 3D in gaming is that games are interactive.

To try to create a consumer market for 3D, I and the other members of the early DirectX team acquired a UK company called RenderMorphics. The company was composed of brilliant British mathematicians who had made amazing strides towards achieving a general purpose real-time 3D engine that could be used in software but also was designed to enable progressive hardware acceleration. We saw this architecture as the solution for creating a 3D hardware market on the PC, because video chip developers could start by introducing graphics chips that accelerated the lowest-level, simplest components of the 3D pipeline and gradually evolve their hardware to take on more and more of the entire 3D pipeline as the market matured. They could do this without game developers necessarily having to worry about their older games' compatibility with each new generation of hardware. This was how Direct3D was born.

What's interesting about early 3D architecture is that it was not based on realistic simulation of light but on a set of well-established tricks for producing realistic results without doing the heavy physics calculations. These tricks were applied most commonly in Hollywood for creating linear noninteractive effects. They were not well-suited to real-time hardware acceleration or rendering highly dynamic interactive environments. Companies like Nvidia, Matrox, and 3dfx from that era struggled with wildly divergent chip architectures in an effort to find a practical consumer balance for real-time gaming 3D. Nvidia's first chips were based on a quad-polygon architecture instead of triangular polygons. Matrox couldn't render texture maps, and 3dfx wanted to promote its own proprietary gaming API to prevent competing 3D chip makers from entering the PC market. Although heavy handed, the introduction of DirectX made it clear that PC gaming would from then on be the purview of Windows, and if you wanted to make 3D hardware for games it would need to support Direct3D.

From versions 3.0 to 7.0, DirectX supported a 3D paradigm that lent itself to progressive hardware acceleration and general-purpose interactivity. It was very good at handling highly interactive environments with many moving objects and light sources, although there were distinct limitations to its potential realism. 3D chip makers wanted to improve on this, so Microsoft made a radical change to Direct3D in DirectX 8 that for the first time introduced pixel and vertex shaders. Although we'll never know for sure, in retrospect I wonder if this architecture "advance" wasn't actually a major step backward. Pixel shaders were a real-time implementation of a technique used to produce realistic lighting effects in noninteractive movies. Although theoretically improving the possible "realism" of a scene, using them placed severe limitations on the versatility of a 3D environment in real time. For example, to use pixel shaders, you had to rigidly define all the lights and light properties in a scene, which essentially shackled the truly dynamic lighting capabilities of DirectX 7.0. Only recently in later generations of Direct3D has some of the versatility of DirectX 7.0 been restored while preserving the benefits of enhanced realism associated with the use of pixel shaders.

The problem with using Hollywood movie techniques to create realistic 3D in gaming is that games are interactive. It is *vastly* harder to achieve the realism that is possible in a static video frame in a highly interactive, real-time environment. A huge issue is that all the apparent physics effects you see in a 3D movie can be created by an artist by hand. In a game, those physics effects are much harder to hand-author into the world. To look truly realistic *and* be interactive requires that a 3D world be represented in a highly abstract state with huge bodies of physics assumptions removed from the scene for real-time computation at render time. The CPU/GPU architectures needed to accomplish this feat for gaming look nothing like the acceleration architectures that make sense for movies. Massive hardware acceleration for physics, branching, and vector transformations needs to sit side-by-side with the rendering and composition hardware to create highly dynamic and realistic 3D scenes.

It could be said that one of the reasons for the exploding cost of producing modern games is that more and more handcrafted art is needed to compensate for the lack of realistic physics acceleration. One simple example of this is creating realistic facial animation in a game when a character speaks. Today, this is accomplished by "rigging" a 3D model of a face with virtual muscles, which oddly enough is called "boning" the model. Artists use authoring tools like Maya or 3D Studio Max to precalculate realistic facial deformations to match prescripted speech. The result is a static animation that moves its lips realistically to static speech. Developers need to create a separate animation for every piece of character dialogue. As such, creating a character that can realistically use a large vocabulary and deliver a range of expressions while interacting dynamically with a real player requires an enormous volume of pregenerated artwork. The CPU is capable of calculating these transformations in real time in response to, say, a live voice dialogue with a virtual character, but would have to send a flood of real-time adjustments to the 3D object stored on the GPU over the bus.

What's the solution? AMD and Intel are both working on next-generation CPUs that incorporate GPUs on the same die that for the first time will enable extraordinary speed and cooperation between the CPU and GPU. These new architectures may well provide a tremendous leap in ultra-realistic interactive graphics and physics. We'll explore this topic in much greater detail in a future issue; stay tuned. ▲

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades of the Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM-quality entertainment content over the Web.

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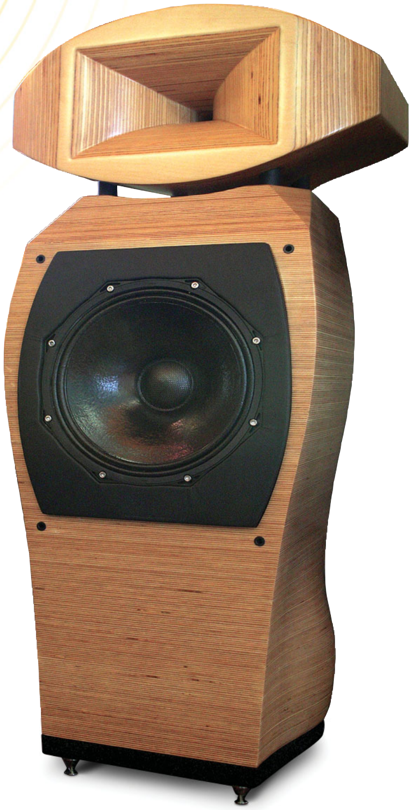
CyberPOWER Inc.

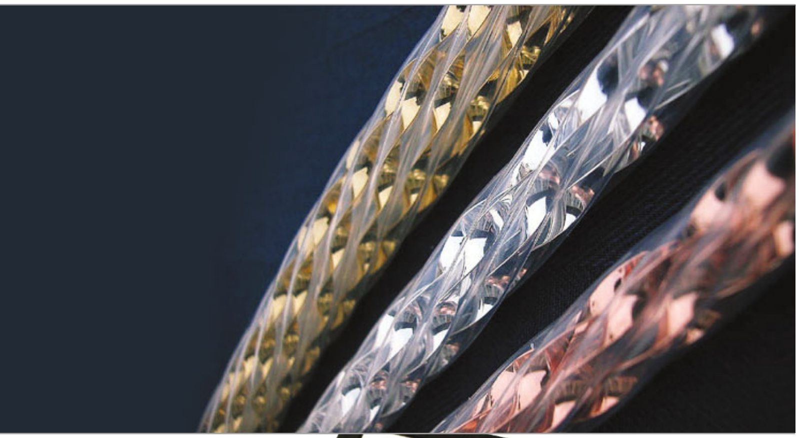
DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It

Are your dreams layered and lacquered? Or are they shiny and twisted? We'll venture to guess that you're no stranger to dreams of dense silicon, so don't skip the bit at the end.

by Marty Sems





Loiminchay Kandinsky

As mariners to a Siren, we were drawn down uncharted corridors by a haunting song full of promise. In an antechamber of the Sands, far from the bustling avenues of commerce, we first beheld the handcrafted beauty of the Loiminchay Kandinsky (www.loiminchayaudio.com). And there we would have foundered, and forever remained, had we not plugged our ears with trade show tchotchkes and lashed ourselves to a passing catering cart. We don't know from their namesake, but dang, these are cool speakers. The unique wooden horn shapes the call of the 2-inch beryllium driver, while a 10-inch mid-bass and a 12-inch woofer rumble from the deeps, lashing your hull under the waterline. The laminated speakers range from $45,500 to $51,500 in birch, depending on the finish, with a cherrywood model available for $75,000. The Kandinsky's Achilles' heel (or Polyphemus' eyeball for our Cyclopean friends) is the fact that Loiminchay is only planning to make 50 sets per year.

Bertram ProXima

Of course, the care and feeding of exquisite speakers should involve exquisite cabling. Denmark's Bertram (www.audiokabel.dk), part of Audionord AB in Sweden, sells these rather fantastic speaker cables. Inside each conductor are twisted ribbons of extremely pure silver or oxygen-free copper for low resistance and capacitance. The ribbons are encased in Teflon with an inert gas to prevent oxidation. The company has applied the same principles to signal cables, and soon, power cables, as well. Bertram's rep estimated U.S. pricing at $18,000 for a set of silver cables and $14,000 for copper. He also hinted that gold ProXimas could be custom-ordered.

Bitmicro E-Disk Altima

Talk about data density. The quiet little elves at Bitmicro (www.bitmicro.com) crammed 1.6TB of fast SLC NAND memory into a 1.7-inch tall, 3.5-inch wide hard drive form factor last fall, fitting the resulting SSD with a 4Gbps Fibre Channel interface. Now they're doing it again, this time with an Ultra320 SCSI connection. The E-Disk Altima family ranges from 16GB on up a hundredfold, with an average price of about $40 per gigabyte ($64,000 for 1.6TB). Models 640GB and smaller are no taller than a hard drive at 1 inch. And the word is that Bitmicro's 2.5-inch lineup will expand to 832GB this year using less expensive MLC NAND chips. ▲

The Dirty Dozen

Are These Cases Worthy Of Your Components?

P182 Special Edition
$229
Antec
www.antec.com
●●●◐

X-Jupiter S-BK
$159
Apevia
www.apevia.com
●●◐

If you put some thought into it, the case you buy today will see you through countless motherboard, CPU, memory, and graphics card upgrades. But unlike most hardware you see covered in the pages of *CPU*, you can't benchmark a case: Assessing enclosures is largely subjective.

To keep this roundup as objective as possible, we evaluated these high-end cases based on how builder-friendly they are; how easy it is to upgrade (install motherboards of various sizes, CPU coolers, or longer graphics cards); what cooling options you have to toy with; and whether the case might survive dozens of trips to LAN parties, months of seclusion in a dusty computer cabinet, and years of abuse. Oh, and to get the coveted *CPU*-seal-of-approval, these boxes have to turn heads with more than just Plexiglas and LEDs.

Antec P182 SE

The midtower P182 Special Edition is virtually identical to the vanilla P182 but features polished chrome side and front panels that just scream to be put on display. The panels also attract more fingerprints than CSI's crime lab, but the included cloth helps keep them pristine. The front door covers the drive bays and power and reset buttons, but not the front panel ports.

Inside, you'll find a dual-chamber design that segregates the bottom-mounted PSU bay and lower HDD bay from the motherboard and ODDs. Two 120mm fans in the upper-left corner air out the CPU while a third resides in front of the PSU to help evacuate heat. Overclockers should install an additional fan in the front panel to prevent a hot spot from forming there. Two grommeted holes in the rear panel accommodate an externally-mounted radiator. Other features we liked include the LED work light, grommeted HDD screws, and fan speed controls. Also note: If your motherboard has a top-oriented ATX power connector, your PSU cables may not be long enough to reach it. 10-inch or longer graphics cards won't fit if you're using the upper 3.5-inch drive cage.

A few size limitations keep the P182 SE from standing toe-to-toe with the top performers in this roundup, but it really shines where it matters most.

Apevia X-Jupiter S-BK

CyberPower's chassis manufacturer, Apevia, sent us the X-Jupiter for consideration. This tower features a heavy-duty, black anodized aluminum and mesh front panel, which is adorned with blue LED accents, a fan speed controller, and LCD temperature display. The frame and side panels are composed of a much thinner aluminum, making for a light chassis overall. The typical front-panel ports are moved to the top of the case, integrated into a rectangular plastic fan bay with a sliding shutter. A 250mm blue LED fan in the side panel makes sure plenty of fresh air gets to the X-Jupiter's inner atmosphere.

Inside, the standoff holes are labeled to make installing your motherboard a cinch. You can also install 12- x 13-inch eATX motherboards, but we had to relocate a poorly-placed cable clamp to do so. The expansion card retention mechanism secured our single 8800 Ultra, and the X-Jupiter can handle multiple large graphics cards. The four fans produced an audible hum on the low setting and a distracting din on high. We liked the separate intake

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◐ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Cosmos S
$249.99
Cooler Master
www.coolermaster.com
●●●●◖

CM Stacker 830 SE
$229.99
Cooler Master
www.coolermaster.com
●●●◖

Poseidon 310
$109
Gigabyte
www.gigabyte-usa.com
●●●

and exhaust controls on the front panel, but the unit's wiring contributes to a lot of excess clutter.

The X-Jupiter's front panel makes a good first impression, but the rest of the case is rather uninspiring.

Cooler Master Cosmos S

Based on the high-end PCs we've seen recently, Cooler Master's cases seem to be the boutique builder's chassis-of-choice. The Cosmos S has a metallic silver frame and black aluminum-and-mesh front, top, and side panels. The backlit power button is touch-sensitive and resides on the top of the case near the front-panel ports, which are concealed by a sliding plastic cover. The Cosmos S features metal rails at the top and bottom to make lifting and moving the case easy.

You can access the case's interior by pressing the two metal tabs on the rear panel. The case features a 200mm side panel fan, a 120mm red LED front panel fan, and two more 120mm fans in the top and rear panels. Optical drives lock in place with Cooler Master's unique button-style mechanisms. Watercooling is easy to add to the Cosmos S with the pair of grommeted holes for tubing in the back and unique bay on top of the case large enough to accommodate a radiator. The bottom-mounted PSU bay includes a removable air filter. Like we mentioned with the Antec P182SE, however, a PSU in the Cosmos S will need a long ATX power cable to accommodate motherboards with top-oriented connectors.

With the Cosmos S, Cooler Master crafted a case that's as much a pleasure to work with as it is pleasing to behold. Apparently boutique builders know what they're doing.

Cooler Master Stacker 830 SE

The Stacker 830 SE comes in silver or anodized black brushed aluminum. The front panel is composed of thick aluminum with a mesh grille. You can swap the hinge to open the front panel to the left or right. Backlit power and reset buttons and two extra USB ports are in close proximity to the front-panel ports on the top front edge of the case. The Stacker 830 SE also features an ever-handy removable motherboard tray, which simplifies the installation (or upgrading) of the CPU, heatsink, and memory.

A pair of tabs on the back panel release the sides, but the sliding latches that secure the motherboard tray are somewhat flimsy. Cooling is not an issue with the CM Stacker 830. The side panel supports four optional fans; the front and rear panels come with 120mm fans; and there's room for more fans in the top and bottom panels. Two ports in the rear panel also let you install an external radiator. The Stacker 830 SE offers several builder-friendly features, including tool-less locking mechanisms for 5.25-inch drives and the 4-in-3 device module, which lets you install four HDDs in any three 5.25-inch bays. (Removing this unit was a pain, however.) As an added bonus, Cooler Master threw in an aluminum mouse pad.

The Stacker 830 SE is a smartly designed case loaded with features any enthusiast can appreciate.

Gigabyte Poseidon 310

The Poseidon 310 midtower was one of the smaller cases we tested. The unit, available in silver or black, features a steel frame and side panels with an attractive, diamond-cut, brushed aluminum front panel. Gigabyte arranged the backlit

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Armorsuit PC-P80
$399
Lian Li
www.lian-li.com
●●●●

Aztec
$89.99
Raidmax
www.raidmax.com
●●●

KL03S
$159
SilverStone
www.silverstonetek.com
●●●●

power button and front-panel ports vertically below the door. Except the front panel, the Poseidon 310 is identical to the Gigabyte iSolo 210, which we reviewed in the February 2008 issue of *CPU*. (See page 27.) The extra ten bucks you'll spend on the Poseidon 310 gets you a Plexiglas window you can swap with the panel's mesh grille in a matter of minutes.

You can keep your components cool with the pair of 120mm fans (an intake in the front and an exhaust in the rear) or take advantage of the grommeted holes in the back panel to install Gigabyte's 3D Galaxy II watercooling system ($129.99; www.gigabyte-usa.com) or another externally-mounted system. The Poseidon 310's tool-less features, such as the expansion card bracket mounts and the ODD mounts were simply adequate. Because of the compact size, only ATX and mATX motherboards were supported. Our 8800 Ultra barely fit when the top 3.5-inch HDD bay was occupied, but kudos to Gigabyte for pulling it off in a midtower.

The Poseidon 310 was one of the more reasonably-priced cases we tested, but it never felt cheap. Space constraints and a lack of additional fan bays are sure to make cooling high-end components tricky.

Lian Li Armorsuit PC-P80

When listing off the top case manufacturers, Lian Li's name is sure to come up. The Armorsuit PC-P80 is a massive hunk of black anodized aluminum that looks more like a skyscraper than a PC case. The front panel features a reversible door with three 140mm blue LED fans. Each of the case's 12 5.25-inch bays features a mesh cover to let the fresh air in. The top panel features high-quality power and reset buttons along with the front-panel ports underneath a logoed hatch. Just inside the door, you'll find a fan speed control knob for tuning the intake fans.

Inside, the PC-P80 features modular drive cages and a unique crossbeam with PCI card braces. Our 8800 Ultra had plenty of room to breathe, as did our eATX server motherboard. The back panel features 10 expansion brackets and is peppered with vents. Rubber grommets hold the HDDs in place, but the ODDs require conventional screws. The top panel lifts off to allow greater access to your internal components. The fans produced little noise at the low setting but grew louder when turned up.

The PC-P80 is big, but it was the little things we liked best, such as the ball-bearing door stop, diamond-cut edges, an abundance of noise-killing rubber grommets and washers, and four grommeted holes for installing dual liquid-cooling systems. There's even room at the bottom of the case for mounting a radiator. The PC-P80 is pricey, but the sky's the limit with regard to the hardware you can install.

Raidmax Aztec

Raidmax specializes in affordable enclosures that have many builder-friendly features usually only found in more expensive cases. The Aztec is black, but the front panel has blue LED accents and comes in your choice of yellow, silver, orange, or blue. The door conceals the front-panel ports (just USB and audio), and a 120mm intake fan behind a wire mesh grille. The side panel includes a window with an 80mm blue LED fan mounted in the upper-left corner.

The side panel swings open from the top to reveal a horizontal crossbeam equipped with an 80mm fan and a PCI

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

card bracing mechanism. The Aztec's HDD cage rotates outward to make installing drives easier, but pivoting the cage on the metal grooves was less than smooth. HDDs install on tool-less drive rails, and tool-less locking mechanisms secure the ODDs. The expansion cards, however, didn't receive the same tool-less treatment. The Aztec also doesn't support eATX motherboards, and don't even try installing a graphics card longer than 9.5 inches (no 8800 Ultra, or HD 3870 X2). The bottom of the case features a handy tool drawer, and an additional fan bay lets you add cooling to the upper HDD cage. We also liked the re-movable motherboard tray.

The Aztec loses points for failing to support high-end graphics cards, but the removable motherboard tray and an abundance of tool-less features make it a worthwhile contender.

SilverStone KL03S-W

Silverstone's cases are typically cool customers, and the black or silver KL03, or third-generation Kublai case, is no exception. The brushed aluminum front panel is reversible and features wire mesh vents and SilverStone's snowflake logo. Front-panel ports and power and reset buttons on the top panel are set off with a blue LED ring. The steel frame and side panels made

Casing The Specs

	External ports	Drive bays	Cooling	Window
Antec P182 Special Edition	2x USB, 1x FireWire, mic and audio out	6x 3.5-inch internal, 4x 5.25-inch external, 1x 3.5-inch external	1x 120mm intake fan, 2x 120mm exhaust fans, 2x 120mm fans (optional)	None
Apevia X-Jupiter S-BK	4x USB, 1x FireWire, mic and audio out	6x 3.5-inch internal, 5x 5.25-inch external, 2x 3.5-inch external	1x 120mm intake fan, 2x 120mm exhaust fans, 1x 250mm side fan	None
Cooler Master Cosmos S	4x USB, 1x FireWire, 1x eSATA, mic and audio out	4x 3.5-inch internal, 7x 5.25-inch external	1x 120mm intake fan, 2x 120mm exhaust fans, 1x 200mm side fan	None
Cooler Master CM Stacker 830 SE	4x USB, 1x FireWire, mic and audio out	4x 3.5-inch internal, 9x 5.25-inch external	1x 120mm intake fan, 1x 120mm exhaust fan, 5x 120mm fans (optional)	None
Gigabyte Poseidon 310	2x USB, 1x FireWire, mic and audio out	3x 3.5-inch internal, 5x 5.25-inch external, 2x 3.5-inch external	1x 120mm intake fan, 1x 120mm exhaust fan	Optional mesh or window
Lian Li Armorsuit PC-P80	4x USB, 1x FireWire, 1x eSATA, mic and audio out	Up to 6x 3.5-inch internal, up to 12x 5.25-inch external	3x 140mm intake fans, 1x 140mm exhaust fan, 1x 120mm exhaust fan	None
Raidmax Aztec B	2x USB, mic and audio out	4x 3.5-inch internal, 4x 5.25-inch external, 2x 3.5-inch external	1x 120mm intake fan, 1x 120mm exhaust fan, 2x 80mm side fans	Side panel
SilverStone KL03S	2x USB, 1x FireWire, mic and audio out	4x 3.5-inch internal, 4x 5.25-inch external, 2x 3.5-inch external	1x 120mm intake fan, 1x 120mm exhaust fan, 2x 120mm fans (optional)	Side panel
Sunbeam Transformer	2x USB, mic and audio out	6x 3.5-inch internal, 5x 5.25-inch external, 2x 3.5-inch external	1x 120mm exhaust fan, 2x 80mm side LED fans, 1x 80mm top LED fan	Side panel
Tagan Black Pearl WCR Edition	2x USB, 1x FireWire, mic and audio out	8x 3.5-inch internal, 7x 5.25-inch external	1x 120mm intake fan, 1x 120mm exhaust fan, 4x fans (optional)	Side panel
Thermaltake SwordM VD5000BNA	2x USB, 1x FireWire, 1x eSATA, mic and audio out	6x 3.5-inch internal, 6x 5.25-inch external	1x 120mm intake fan, 4x 120mm exhaust fans, 7x fans (optional)	None
Zalman Z-Machine GT1000	2x USB, 1x FireWire, mic and audio out	6x 3.5-inch internal, 4x 5.25-inch external, 1x 3.5-inch external	2x 92mm intake fans, 1x 120mm exhaust fan	Side panel

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

the KL03 one of the heavier chassis that we tested.

Removing the vented and windowed side panel was somewhat tricky because there was no release handle. Inside, we found a crossbeam that features two 120mm fan bays positioned over the graphics card area and six adjustable braces to hold cards in place. SilverStone includes a pair of 120mm intake and exhaust fans to cool the KL03.

SilverStone didn't include grommeted holes for mounting an external radiator. ODDs slide into any of the four bays with the help of tool-less drive rails. The HDD bay features unique sliding trays and a single SATA adapter for hot-swapping the topmost HDD. You can also purchase additional CP05 adapters for the rest of your SATA drives ($5.99; www.newegg.com). The case's extra-long profile lets you install server-size motherboards up to eATX, and there's plenty of room to install multiple 10.5-inch graphics cards.

Selling the KL03 probably won't make SilverStone rich, but enthusiasts and builders who pick it up will have struck gold.

Transformer
$75.99
Sunbeam
www.sunbeamtech.com
●●

Sunbeam Transformer

Sunbeam's Transformer is the least expensive case in this roundup. The stylized plastic front panel features an open grille and a door decorated with a simple emblem and a rather flimsy power button. There's also a power button on the front panel to turn the machine on with the door open. The Transformer's USB and audio ports look like an afterthought on the top of the case. If lighting bangs your gong, then you'll like that the Transformer comes with a CCFL (cold-cathode florescent lamp) kit for the front grille.

The Transformer's frame and side panels are composed of a rather thin steel, making it one of the lighter steel chassis we looked at. Inside, the Transformer bears a striking resemblance to Apevia's X-Jupiter. The two cases have the same internal toolbox, tool-less drive rails, drive cages, and tool-less PCI card mounting mechanism. Sunbeam includes a single 80mm green LED fan in the top panel and two more on the side panel. The case also features 120mm intake and exhaust fans in the front and rear panels, respectively. The abundance of fans make the Transformer better suited to air- than watercooling. The Transformer is roughly 2 inches shallower than the X-Jupiter, making it incompatible with motherboards larger than ATX and barely able to handle 10.5-inch graphics cards.

Despite costing less than half as much as Apevia X-Jupiter, the Transformer's overwrought aesthetics, conventional interior, and clunky front panel won't do much for the average enthusiast.

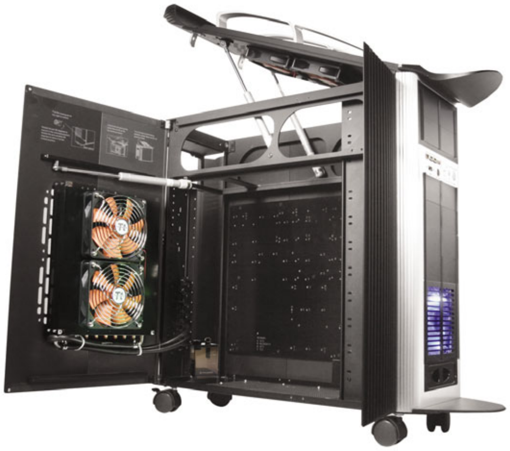
Tagan Black Pearl WCR Edition

The Black Pearl WCR (watercooling ready) chassis features thick, anodized black aluminum panels and a bare aluminum frame. A windowed side panel, blue LED "A+" logo, and a 4-channel temperature display and fan controller add aesthetic touches to the Black Pearl's otherwise minimalistic presence.

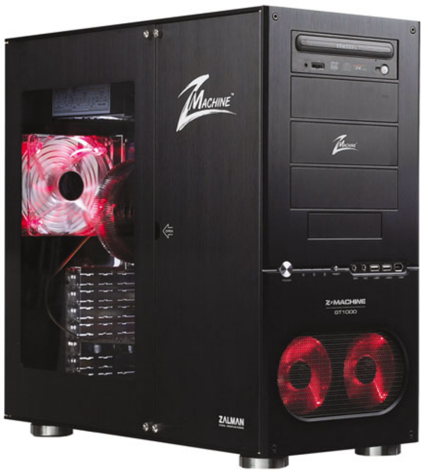
Two ports in the top panel let you easily install a watercooling system. Tagan only includes two 120mm fans, but you can install another pair of fans in the rear panel. The Black Pearl WCR features three separate chambers to keep the HDDs, PSU, and motherboard separated for better thermal management. Like the P182 SE and Cosmos S cases, the Black Pearl's PSU bay is at the bottom of the case, but unlike those chassis Tagan orients the

Other features	Dimensions (HxWxD, inches)	Price
Tool-less features, work light, mirrored finish, dual-chamber structure	21.3 x 8.1 x 19.9	$229
Tool-less features, fan speed controls, LED fans, internal accessory box	21.5 x 8.5 x 22.3	$159
Touch-sensitive power button, tool-less features, LED fan	23.6 x 10.5 x 24.7	$249.99
Mesh side panels, tool-less features, removable motherboard tray, LED fan	21.1 x 9.9 x 25.1	$229.99
Tool-less features, illuminated front panel, optional watercooling	17.3 x 7.9 x 19.9	$109
Tool-less features, optional watercooling, LED fans, PCI card braces	24.9 x 8.7 x 24	$399
Tool-less features, LED fans, removable motherboard tray, front panel LEDs	17.8 x 8 x 20.5	$89.99
Reversible door hinge, optional side panel fans, tool-less features	20.7 x 8.7 x 23.4	$159
Fan grilles, tool-less features, CCFL illumination, internal accessory box	20.6 x 8.1 x 17.7	$75.99
Fan controller, optional watercooling, tool-less features, LED front panel	23.2 x 8.3 x 23.4	$249.99
Hydraulic panels, wheels, tool-less features, cable management features	25.6 x 9.4 x 30.3	$499
Tool-less features, LED fans, dual-panel side panels	17.7 x 8.7 x 18.9	$279.95

Black Pearl WCR Edition
$249.99
Tagan
www.tagan.com
●●●●



SwordM VD5000BNA
$499
Thermaltake
www.thermaltakeusa.com
●●●●



Z-Machine GT1000
$279.95
Zalman
www.zalman.com
●●●●

motherboard upside down. We found that standard-length SATA cables may not reach to the bottommost HDDs if the motherboard's SATA ports are at the bottom of the board.

This case is suited to high-end systems: It accommodates eight HDDs, eATX motherboards, and 10.5-inch graphics cards. The Black Pearl forgoes drive rails, and as a result, our ODD got stuck and took some determined prying (and a little gouging) to remove. Features we liked include the CPU cooler hood and the fixed thumbscrews used to disengage the side panels and HDD bays.

Tagan has a solid enthusiast chassis on its hands in the Black Pearl WCR.

Thermaltake SwordM

The SwordM is a shameless and unapologetic show off. Inspired by the subtle curves of ancient Chinese swords, this extruded aluminum behemoth features a silver brushed aluminum front panel and black anodized side panels. It was easily the heaviest case we tested. Despite several tool-less features, you'll need a screwdriver to install the bottom fin and casters. The top fin flips up to make room for Thermaltake's touch-panel LCD (not included). The top panel sports two sturdy but stylish brushed aluminum handles. USB, FireWire, and audio ports; high-quality power and reset buttons; and eSATA and SATA power ports adorn the front panel.

Remove several thumbscrews in the side panel and unfasten the fixed screws on the top panel to see something special: Three hydraulic pistons force the panels out and up with a satisfying hiss. The SwordM ships with two 120mm fans in the rear panel, two top 120mm fans, and a single 120mm blue LED fan in the front panel. You can also install up to six additional 120mm fans. The rear panel is actually a hinged door with notches to accommodate externally-mounted radiators. The back end of the beast also has predrilled holes for mounting a water pump and reservoir. Other features we liked include the tool box in the bottommost drive bay, modular HDD cage, labeled standoffs, and the tool-less expansion card mounting mechanisms. The case also easily handled our large server motherboard and multiple 10.5-inch-long graphics cards.

Chassis don't get any classier than this. Sadly, classy costs extra.

Zalman Z-Machine GT1000

Zalman, best known for its thermal products, sent us the black Z-Machine GT1000 (also available in gray). The side panels and frame of this midtower are constructed of thick, black anodized aluminum with a brushed finish. Two 92mm red LED fans (the gray model comes with blue LED fans) occupy the bottom portion of the front panel. You'll find the front panel ports and quality power and reset buttons below the four 5.25-inch drive bays and lone 3.5-inch bay.

Impressively, we couldn't find a single rivet on this case: You could completely disassemble the GT1000 if so inclined. The split-side panel doors open outward to reveal a surprisingly roomy interior (ATX motherboards only) capable of housing multiple 10.5-inch graphics cards. The top two ODD bays make use of fixed thumbscrews, and the HDD cage uses rubber-coated bars and thumbscrews to secure the drives. You can also mount two more HDDs to the bottom of the case using Zalman's unique latching peg assembly. However, Zalman didn't include any features to make adding an externally-mounted watercooling system simple, and plain old thumbscrews secure your PCI cards to the back panel.

Still, Zalman built the Z-Machine GT1000 with the enthusiast in mind, and it really shows. ▲

by Andrew Leibman

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Godfather of all chassis.

NVIDIA 3-WAY SLI-READY CERTIFIED CHASSIS

It's in its DNA. Ultra-quiet and performance-minded series chassis now just got better. Armor+, with its world's only 10 PCI expansion slots capability, allows for multiple graphic card configuration such as CrossFire X (up to 4 cards) and SLI (up to 3 cards). Both Armor+ and Armor+ MX features convertible top making dreadful Liquid Cooling System maintenance a thing-of-the-past. Signature oversized side panel fan will take on anything that you throw at it.

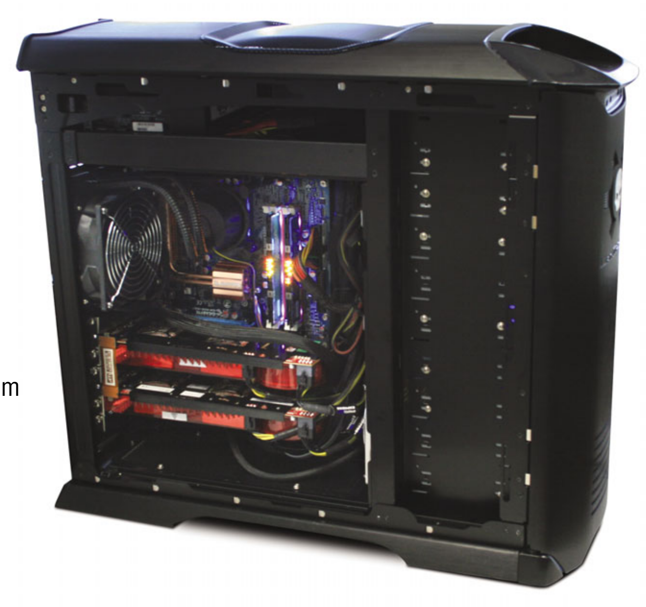
List of its amazing features will fill this whole page, so make sure to logon to www.thermaltakeusa.com to learn more..

Thermaltake
COOLall YOUR LIFE

ARMOR+ ARMOR+ MX

DELL www.dell.com · RadioShack. You've got questions. We've got answers. · MICRO CENTER · Fry's Electronics Outpost.com · BEST BUY · newegg.com · circuit city · TigerDirect.com · PC CLUB · amazon.com and you're done.

M1 Elite-LC
$5,240 (as tested)
War Machine
www.projectwarmachine.com
●●●●



M1 Elite-LC

War Machine specializes in custom desktops for gamers and enthusiasts, and with a Gigabyte GA-X48-DQ6 motherboard, two ATI HD 3870 X2s in CrossFireX, and an Intel QX9770 overclocked to 4GHz (from 3.2GHz), the M1 Elite-LC is a liquid-cooled benchmark destroyer. War Machine houses the powerful components inside a black Cooler Master Stacker 832, complete with War Machine's skull motif, perfect for scaring opponents at your next LAN party.

The CM Stacker is rather bulky, which adds to the M1 Elite-LC's daunting appearance, but the all-aluminum case is light enough to transport. On the interior, the SATA and power cables are dressed with mesh tubing and tied together. There isn't much fancy lighting (a blue light from a fan in the drive cage), but the orderly routing gives you space to see and work with the components. Additionally, the cabling design helps maintain an even airflow from the fans.

To cool the HD 3870 X2 CrossFireX cards, War Machine installs a 120mm fan 5.25-inch external bay controller to turn the fan speed—and noise—down below the drive cage, parallel to the graphics cards. In front of the drive cage, the M1 Elite-LC has a 120mm fan that cools the dual Raptor X drives and 1TB Seagate Barracuda storage drive. There's also a 120mm fan at the top of the case. The M1 Elite LC uses an OEM Asetek liquid-cooler to dissipate heat from the Intel Core 2 Extreme QX9770, and War Machine replaces the standard ball bearing fans in the radiator with NMB-MAT Hydro Wave bearing fans to improve reliability. The sheer number of 120mm fans made the M1 Elite-LC a little noisy, but the airflow was effective.

The M1 Elite-LC features impressive hardware, and we liked that War Machine included the latest Radeon HD 3870 X2 graphics processors. War Machine overclocked the Intel Core 2 Extreme QX9770 to 4GHz, but we didn't experience any stability problems during our Prime 95 stress test. You can see the system's overclocking power in the 22798 3DMark06 and 7090 PCMark Vantage Pro 1.0 overall scores. In terms of gaming prowess, M1 Elite-LC produced impressive 8fps in Crysis, 54fps in World in Conflict, and 93fps in S.T.A.L.K.E.R. (Our tests were run with the beta CrossFireX driver, so you may see even better results with a mature driver.)

When the system arrived, we had to reattach a SATA connector to get the M1 Elite-LC running, but the shipping box had a few puncture holes; we believe it was roughed up in transport. Other than a few noise complaints, the M1 Elite LC provided a lot of power for its $5,240 price. ▲

by Nathan Lake

Specs: CPU: Intel Core 2 Extreme QX9770 @ 4GHz; Motherboard: Gigabyte GA-X48-DQ6; RAM: 2GB Crucial Ballistix Tracer DDR2-1,066MHz; HDD: 150GB Western Digital Raptor X (2x; RAID 0), 1TB Seagate Barracuda 7200.11; Graphics Processors: ATI HD 3870 X2 (CrossFireX); PSU: Silverstone S1000-NV; Windows Vista Ultimate

Benchmark Results

3DMark06	
Overall	22798
SM2.0	8602
HDR/SM3.0	11805
CPU	5858
Cinebench 10*	
Multithreaded (score)	15179
Multithreaded (min:sec)	0:56
Dr. Divx 2.0.1*	3:00
POV-Ray 3.7 Beta**	3558
PCMark Vantage Pro 1.0	
Overall	7,090
Memories	4842
TV And Movies	4861
Gaming	6345
Music	6750
Communications	6656
Productivity	6873
HDD	4741
WinRAR 3.71*	1:41
Crysis 1.1	8
Company of Heroes 2.1.0.2 (4XAA)	54
World in Conflict 1.005 (4XAA, 16XAF)	54
S.T.A.L.K.E.R 1.005	93

** minutes:seconds*
*** pixels per second*
Games tested at 2,560 x 1,600

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Samsung SpinPoint F1 1TB

The newest member of the terabyte club has a really good excuse for showing up so late. Samsung decided to wait until it could develop a 1TB hard drive, model HD103UJ, using only three PMR platters, unlike the 4- and 5-platter models fielded by Seagate and Hitachi, respectively. Fewer hard disks and heads can mean less complexity, lower power consumption, and higher transfer rates, among other things.

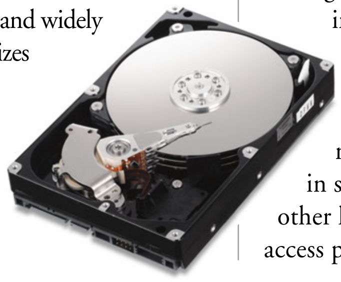
The dense, 334GB-per-disk SpinPoint F1 lineup comes in 160GB to 1TB capacities with NCQ and widely varying cache buffer sizes (8MB to 32MB). Samsung is pitching the drive family for DVRs, business storage, and desktop use. If you edit video, look long and hard at these drives.

What's remarkable about this 7,200rpm drive is how well it stands up next to a current-gen, 10,000rpm Raptor WD1500-ADFD. The SpinPoint F1 can't match the Raptor's performance in server tasks, but it beats it in sequential transfers by 15 to 20MBps. It also wins the PCMark Vantage Vista startup and Photo Gallery import tests.

Compared to the 1TB competition from Seagate and Hitachi, this quiet Samsung's speedy reads and writes put it well ahead in sequential transfer speeds. On the other hand, its more moderate random access performance—which helps to keep the drive running nigh-silent—makes it more suitable for single-user applications. ▲

by Marty Sems

SpinPoint F1 1TB
$299
Samsung
www.samsung.com
●●●●◖



Specs: SATA 3Gbps; NCQ; 7,200rpm; 32MB cache; 8.9ms avg. seek; 27 to 29dB; 300G non-operating shock tolerance; 3 disks/6 heads; Three-year warranty

Benchmark Results

PCMark Vantage 1.0.0 (Nov 07 patch)	
HDD Score (points)	3439
Defender (MBps)	19.4
Gaming (MBps)	12.5
Photo Gallery import (MBps)	35.9
Vista startup (MBps)	16.3
Movie Maker edit (MBps)	24.5
Win Media Ctr (MBps)	39.4
WMP music add (MBps)	7.7
Application Loading (MBps)	4.1
HD Tach RW 3.0.4.0, Long Bench	
Read rates, average/maximum (MBps)	95/120
Write rates, average/maximum (MBps)	81.8/91
Random access time* (ms)	16
Burst read rate (MBps)	151.4
Iometer 2006.07.27	
File Server (IOps)	95.66
Web Server (IOps)	99.36

* Lower is better.

Test system: Vista Home Premium, Core 2 Duo E6700 2.67GHz, 2GB DDR2 (1,066MHz), Intel D975XBX2KR, Radeon HD 2600 XT

LG GGW-H20L

GGW-H20L
$449.95
LG
us.lge.com
●●●●

Many users have been waiting for a drive that "does it all." Suddenly, several drives fit that description now that HD DVD burning will never become a commonplace feature.

Prices have dropped considerably for HD on the PC, but they're still high. Sweetening the pill is this $499 Super Multi Blue drive from Hitachi-LG Data Storage. It will burn and read Blu-ray discs, as well as play all those clearance HD DVD movies you've been snapping up for little or nothing. The drive supports LightScribe and book-type bitsetting, but not disc quality scans.

Movies looked sharp and fluid on our test system at full resolution. "Batman Begins" and "King Kong" represented the HD DVD camp, and "X-Men 3" and "Corpse Bride" stood up for BD. "Corpse Bride" in particular showcased the amazing sharpness of HD.

Typically for a blue-laser drive, write performance was go-make-a-sandwich slow for any disc bigger than 4.7GB, although the LG was mostly faster than Sony's BWU-100A or Pioneer's BDR-101ABK. Hopefully, new media with higher speed ratings will help. The relatively quiet GGW-H20L did show some impressive wheels with CDs, single-layer DVDs, and LightScribe labels, however.

A CyberLink playback/authoring/backup bundle ostensibly comes standard, but it didn't with my evaluation unit.

A similar LG drive called the GGC-H20L drops Blu-ray writing but still gives you a DVD±RW that can play any BD or HD DVD movie for as little as $235 online. Hey, that's only six or seven times the cost of a regular DVD burner. Progress! ▲

by Marty Sems

LG GGW-H20L

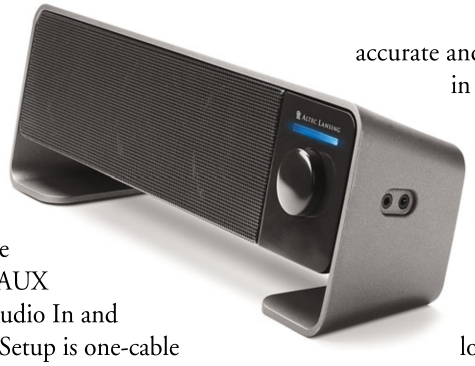
(firm. YLY0; 1X HD = 4.5MBps; hr:min:sec; Nero 7.9.6.0)

20.6GB BD-R25	20.6GB BD-RE25	4GB DVD+R	4GB DVD-R
51:54 (2X TDK @ 4X)	1:22:24 (2X TDK); 1:22:08 (2X Sony)	6:22 (8X Verb)	6:19 (8X Verb)
8GB DVD+R DL	**8.2GB DVD Rip**	**CD-Audio Burn (58m, Nero Exp)**	**CD Rip (58m, 128kbps WMA)**
27:18 (8X Verb @ 4X)	17:25 (ISO)	2:27 (52X Mem)	2:33 (WMP11)

Specs: 6X/2X/6X BD-R/RE, 4X BD-R DL, 3X HD DVD-ROM (read), 16X/8X/16X DVD+R/RW, 4X DVD+R DL, 16X/6X/16X DVD-R/RW, 4X DVD-R DL, 5X DVD-RAM, 40X/24X/40X CD-RW; 2MB cache; SATA

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Altec Lansing SoundBar



Taking everything into consideration, the SoundBar is a niche product, which seems strange to characterize a speaker system as. Though you can plug a notebook, iPod, MP3 player, etc. into the SoundBar's Aux Input jack, the "2+1" system—dual 2-inch full-range drivers and one 2-inch bass driver—is designed to sit underneath an LCD to clear up desk space and eliminate wires.

The SoundBar measures 4.4 x 14.7 x 3.4 inches (HxWxD)—too tall to fit under my 15-inch IBM ThinkVision. The SoundBar did fit under my 19-inch IBM ThinkVision, but the speaker's non-adjustable feet were too narrow to straddle the ThinkVision's base. It did sit as intended under a 17-inch Dell LCD, however, and looked sharp doing it with its jet-black grille and gray trimming. The SoundBar's slimness and simplicity are also admirable. Only a volume knob, which doubles as a mute button, adorns the front. Headphone and AUX inputs are at left, and Audio In and DC inputs are at back. Setup is one-cable easy. Sadly, there's no ability to adjust bass or treble levels.

Though the SoundBar lacks a dedicated sub, Altec Lansing integrates SFX (Sound Field Xpander) and XdB (Extreme Dynamic Bass) bass technologies to widen and deepen output from the angled speakers. I tested using Apple, SanDisk, Samsung, and Toshiba MP3 players; a desktop, notebook, and portable DVD player; and CDs, DVDs, iTunes, WMP, Slacker, and Pandora. Lows were surprisingly full given the SoundBar's restrictions, while mids and highs were mostly accurate and bright. Clarity in individual instruments was expectedly diminished.

If you're after the ultimate audio for a desktop setting, look elsewhere. The SoundBar isn't intended for massive thuds, bullets rifling in surround sound, or violins filling the air with pristine clarity. If you reside in cramped quarters, however, and need a system that's more than serviceable, the SoundBar's space-friendly design and audio output are a nice acquisition for less than $80. ▲

by Blaine Flamig

Specs: Two 2-inch full-range drivers; one 2-inch bass driver; proprietary SFX technology; XdB bass technology; 4.4 x 14.7 x 3.4 inches (HxWxD); Audio In and AUX inputs

SoundBar
$79.95
Altec Lansing
www.alteclansing.com
●●●

Samsung P2 8GB

I could easily address nothing but the P2's exceptional Cosmos interface and remain entirely comfortable recommending this outstanding touchscreen-driven player. Thing is, plenty other facets of the P2 are as deserving of attention, including its Bluetooth functions (you'll need to do the firmware dance to obtain a few of them), outstanding audio quality, customizations, and extras you'll actually use.

Cosmos is definitely where it's at, though. Swiping and tapping through the UI on the P2's sharp, 16:9 display (480 x 272) is a pleasure, and the P2's lack of tactile buttons (there are only four) never hindered my rapture. Cosmos displays menu icons (Music, Video, Pictures, etc.) in a 3D format that continually changes the icons' depth of field as you finger-swipe through them. There's also a Matrix option that lays the icons in a grid and Skin choice that overlays the icons on a photo you select.

Along with Sony's A810 Walkman, the P2's audio quality is the best I've heard to date from a DAP. Volume levels are exceptionally hardy, distortion nonexistent, and mid-tones fuller at default settings than most players' audio enhancements. Samsung offers Street Level and Clarity effects and 12-plus DNSe (Digital Natural Sound Engine) options (Normal, Club, Rock, Studio, etc.), but I preferred the P2's seven-band equalizer to anything else.

Beyond an FM tuner, text reader, audio book bookmarks, three font choices, and File Browser, you get a Prime Pack submenu with a world clock, calendar, and alarm clock (multiple alarms). Datacasts additionally give you RSS-like feeds configurable/syncable from Samsung's bundled Media Studio, a serviceable media manager/file converter that offers a direct tie to Samsung's MusicNet-partnered online store. Bluetooth 2.0 functions include simultaneously pairing two wireless headsets. Additionally, you can pair the P2 with a cell phone to answer calls and speak via the P2's integrated mic. Plus, Samsung's recent Blue Wave (www.mpfreedom.com) program promises continued Bluetooth additions via firmware upgrades, including wireless file swapping and extended phone abilities. ▲

by Blaine Flamig

Specs: Three UI choices; 480 x 272 touchscreen display; Audio: AAC (with 2.08 firmware), MP3, WMA; Video: MPEG-4, SVI, WMV9

P2 8GB
$250
Samsung
www.samsung.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Able Planet IR400T2

If you regularly wear headphones for extended periods of time, comfort is essential. Beside the obvious need for headphones that feel comfortable, you'll want headphones that maintain vibrant bass and treble at low volumes to avoid headaches that may occur from listening to high volumes. Able Planet embeds its headphones with Linx Audio technology, which is an analog circuit that analyzes high-frequency sounds and boosts the primary acoustics to increase the loudness of a source without introducing distortion. We evaluated Able Planet's IR400T2, a set of wireless on-ear headphones, and came away impressed with the headphone's sound quality and speech clarity.

The IR400T2 uses infrared technology to deliver the audio signal. To maintain a strong signal, Able Planet includes four receivers in the headset. For convenient control, the headset has an A/B audio channel switch, as well as thumb-wheel volume control. Able Planet cushions the headset with thick, soft foam, and we were able to comfortably wear the headset for hours at a time.

Most audio purists shudder at the idea of audio processing, so we were leery of the Linx Audio technology. Our tests demonstrated mids and highs comparable to our reference Sennheisser HD 555 headphones. And the separation of voices and individual instruments was particularly impressive. What the IR400T2 lacked was the deep bass you'd expect to hear during action movies and bass-driven music. That being said, the headphones delivered clear mid-bass sounds, such as snare and tom drums or gunfire from pistols.

If you're looking for a set of wireless headphones for gaming or listening to music, Able Planet's IR400T2 provide consistent audio fidelity over the infrared signal. The headphones may not be ideal for those who require deep bass. ▲

by Nathan Lake

Specs: Frequency response: 35Hz to 18,000Hz; SNR: 60db; Rated listening time: 50 hours; Range: 35 to 50 feet; Weight: 6.1 ounces

IR400T2
$179.99
Able Planet
www.ableplanet.com
●●●◖

M-Audio Studiophile AV-40

Usually, if I see a company stamp a pair of desktop computer speakers with a moniker like "Studiophile," I roll my eyes and assume it's a meaningless term that a marketing intern dreamed up to jazz up a product's name. However, in the case of M-Audio's Studiophile AV-40 speakers, the name is well deserved.

The clarity and balance of the sound from the AV-40s is superb: The highs, mids, and lows are all clearly delineated. The mids especially tell of the quality of these speakers. Where I was expecting muddy, overpowering mids, what I heard instead was a clear and balanced sound. The bass response is decent; at 20 watts per channel, the AV-40s won't be rattling your neighbors' windows, but the lowest instruments of an orchestra do sound rich and full.

The AV-40s produce a stereo image so spatially accurate that it was almost like having surround sound. For example, when I listened to Led Zeppelin's "Black Dog," Robert Plant's voice seemed to come from a center channel speaker instead of from the two speakers on either side of me, while the guitars were distinctly spaced to the left and right. In a recording of Strauss's "Blue Danube Waltz," I could clearly hear when a percussionist dropped a stick, and I could tell about where he was sitting.

One knock on these boxes is that there is a lot of noise in the channels. When I pushed the volume just past the halfway point on any recording, the noise was clearly audible. Any louder, and the sound became distorted, as well. It's also worth noting that although these speakers have a number of different connection options, they do not offer 3.5mm ports.

Still, the speakers produce a rich, balanced sound that can fill a room without the volume cranked up. You can find better systems than the M-Audio Studiophile AV-40, but for a set of desktop stereo speakers in this price range, I'd have to hear it to believe it. ▲

by Seth Colaner

Specs: Inputs: RCA line input, 1/4-inch TRS input, 1/8-inch aux input (front); Outputs: 1/8-inch headphone output; Frequency response: 85Hz to 20kHz; Power: 20 watts continuous; Dimensions: 8.75 x 6 x 7.25 inches (HxWxD)

Studiophile AV-40
$199.95
M-Audio
www.m-audio.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Alienware Area-51 m15x

Gaming laptops with 17-inch displays are fairly common, but their smaller brothers with 15-inch screens aren't quite as readily found. Alienware is working to change that by releasing the 15.4-inch Area-51 m15x.

Power and looks are important to many of us when buying a laptop. Of course, power is perhaps most important, but lugging around a huge, boxy laptop we're ashamed of isn't too cool, either. Rocking Intel's 2.8GHz Core 2 Extreme X9000 and Nvidia GeForce 8800M GTX, the Area-51 m15x definitely has power. With its sleek silver finish, smooth QuickTouch system control pad, and six lighting zones, this laptop looked good, too. These lighting zones accent the keyboard, display, and touchpad. What's more, you can customize them with your choice of 12 colors.

I liked that the Area-51 m15x's Smart Bay gave me the flexibility to add up to 320GB of additional storage or an extra battery for up to four hours of computing time.

Although this system works well for gaming and other resource-intensive tasks, it's also great for watching movies in high definition with its 2X dual-layer Blu-ray Disc burner (BD-R/DVD±RW/CD-RW) and crisp, WUXGA display. ▲

Area-51 m15x
$4,789 (as tested)
Alienware
www.alienware.com
●●●●

by Jennifer Johnson

Alienware Area-51 m15x Benchmark Numbers

3DMark06 Pro 1.1	
Overall	9298
SM2.0	4151
HDR/SM3.0	3922
CPU	2575
Cinebench 10	
Multithreaded (min:sec)	2:32
Multithreaded (score)	5798
Dr. DivX 2.0.1*	4:51
PCMark Vantage Pro 1.0	
Overall	3752
Memories	2974
TV And Movies	2541
Gaming	4299
Music	4015
Communications	3465
Productivity	3639
HDD	3738
POV-Ray 3.7 Beta**	872.31
WinRAR 3.71*	3:57
Company of Heroes	19.3
S.T.A.L.K.E.R.	30.165
World in Conflict	15

** minutes:seconds*
*** pixels per second*
**** Games tested at notebook's native resolution: 1,920 x 1,200*

Specs: 2.8GHz Intel Core 2 Extreme X9000; 4GB DDR2-667; 200GB at 7,200rpm; 2X BD-R DL/DVD-RW DL/CD-RW; 512MB Nvidia GeForce 8800M GTX

Dell XPS M1730

Dell's XPS M1730 looks and acts like a blazing-fast gaming machine. With its smoky exterior art, which one of my colleagues described as anaconda-like, and impressive specs, not the least of which is dual Nvidia cards in SLI, this machine is made for gaming on the go.

Although my system came with dual Nvidia GeForce 8800M GTX cards, SLI was not enabled by default. As you would expect, SLI will make a big difference in terms of performance: Without SLI enabled, the system scored 9273 in 3DMark06. After enabling SLI, the score shot to 12636.

For easy access to system stats, including CPU and RAM usage, you'll find a Logitech GamePanel LCD above the number pad. This display also shows the current date and time and countdown and stopwatch timers. Additional plug-ins are available that will display stats for games and applications. On the front spine of the XPS M1730, you'll find a row of media and volume controls. Below the row of media controls, there's an IR sensor for use with the included remote.

If your game of choice is Ageia PhysX-enabled, you'll appreciate Dell's inclusion of the Ageia PhysX PPU. With a PhysX card, you'll enjoy an increased amount of physics-related visual effects, including dynamic motion and interaction. ▲

XPS M1730
$4,489 (as tested)
Dell
www.dell.com
●●●●

by Jennifer Johnson

Dell XPS M1730 Benchmark Numbers

3DMark06 Pro 1.1	
Overall	12636
SM2.0	5825
HDR/SM3.0	6488
CPU	2509
Cinebench 10	
Multithreaded (min:sec)	2:33
Multithreaded (score)	5768
Dr. DivX 2.0.1*	5:14
PCMark Vantage Pro 1.0	
Overall	4445
Memories	3308
TV And Movies	2992
Gaming	3874
Music	4262
Communications	3965
Productivity	4113
HDD	4319
POV-Ray 3.7 Beta**	1249.01
WinRAR 3.71*	3:34
Company of Heroes	29.5
S.T.A.L.K.E.R.	48.28
World in Conflict	18

** minutes:seconds*
*** pixels per second*
**** Games tested at notebook's native resolution: 1,920 x 1,200*

Specs: 2.8GHz Intel Core 2 Extreme X9000; 2GB DDR2-667; 2x 200GB at 7,200rpm; 8X DVD-RW DL/CD-RW; Nvidia GeForce 8800M GTX (SLI)

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Sony BDU-X10S BD-ROM

Warner Bros. Netflix. Best Buy. Since the beginning of 2008, the nails for HD DVD's coffin came in hard and fast. For all practical purposes, it's Blu-ray *uber alles*.

With BD, Sony has finally won a proprietary format fight. (You know what fates befell Betamax and MiniDisc. And Memory Stick has complemented, but not supplanted, competing flash memory card formats.) Perhaps Sony was due. Or maybe the world decided that because HD DVD was every bit as DRMed as BD, yet smaller in capacity and lacking viable burners in the mass market (although some exist), it was time to pull out the cork and let the blue-laser revolution finally flow.

Now, the only obstacle is drive and media price, hence this sub-$200 BD-ROM from Sony. It doesn't burn anything but will read virtually any consumer-grade optical disc except for HD DVD and DVD-RAM. Its read speed is middling among BD drives, but it does come close to matching the LG GGW-H20L's first-prize DVD ripping time.

The BDU-X10S supports disc-quality scanning, unlike Sony's BWU-100A. Its tray opens and closes smartly, not sluggishly, and you can replace its wide, beveled tray bezel with an included skinny one. Also in the box are a SATA data cable, a Molex-to-SATA power adapter, and a tray eject tool, along with a BD-capable version of Cyberlink PowerDVD.

Bummed about the lack of DVD and CD burning? Face it, you should use a $35 DVD writer to reduce the wear and tear on your precious BD, and you'd get better speeds to boot. With the BDU-X10S, Blu-ray is one step closer to commodity prices, assuming the death of HD DVD hasn't also killed off the price-slashing trend. ▲

by Marty Sems

Sony BDU-X10S BD-ROM SATA

(firm. 1.0a; 1X BD = 4.5MBps; min:sec; Nero CD-DVD Speed 4.7.7.15)

8.2GB DVD Rip (ISO)	CD Rip (58m, 128kbps WMA)	Read, avg/max	Access time, random/full (ms)
17:32	3:40 (WMP11)	1.99X/1.99X BD; 5.92X/7.9X DVD	132/250 BD; 130/208 DVD

Specs: 2X BD-ROM, 8X DVD-ROM, 24X CD-ROM; 1.5Gbps SATA; 4MB cache; 7.6 inches deep; one-year warranty

BDU-X10S
$199.99
Sony
www.sonystyle.com
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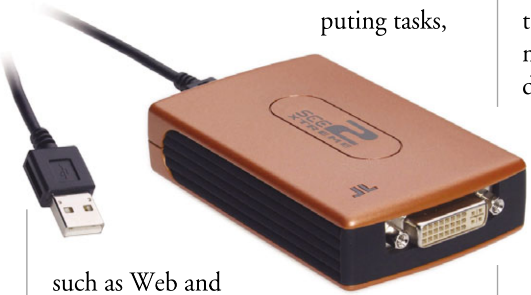
Tritton Technologies SEE-2 Xtreme

At first blush, it seems redundant, if not pointless, to create and market a USB-to-DVI adapter, since most discrete video cards already support multiple monitors. That said, there are just as many laptops that have a single DVI or VGA adapter or PCs that lack internal slots for a second (or replacement) video adapter, not to mention the legions of computer owners who would never consider opening their PC in the first place. It is at these users and these computers that Tritton Technologies' SEE-2 Xtreme is aimed. For this target audience, it's a good option for adding a second (or more) monitor.

To be sure, the USB 2.0 bus speed's maximum bandwidth is only 60MBps compared to a PCI-E x16 slot's 4GBps, so the SSE-2 Xtreme gets a little overwhelmed by HD video, rapid scrolling through complex Web pages, and any sophisticated video game; frame rates are low and there's the occasional stutter.



That said, "normal" computing tasks, such as Web and email, YouTube videos, and office applications, look just fine. The native DVI connection makes digital flat panels look especially good, though there's a bundled VGA adapter to let you keep using that old CRT monitor.

Need more monitors? Just keep plugging in more SSE2-Xs or SEE-2 SVGAs (Tritton's analog VGA version) until you run out of USB ports or have six SSE-2 devices. We tested three at once, and it's somewhat amazing to see. Although Tritton lists the SSE2-X's maximum resolution at 1,600 x 1,200, its driver indicates support for resolutions up to 2,048 x 1,280.

The more we used the SSE-2 Xtreme, the more we envisioned uses for it, finding a way to repurpose old monitors we had sitting around without messing with our perfectly tuned video cards. In this respect, Tritton Technologies has a winner in its hands. ▲

by Warren Ernst

Specs: Max resolution: 2,048 x 1,280; 32-bit color depth; 0.88 x 2 x 4.5 inches (HxWxD)

SEE-2 Xtreme
$119.99
Tritton Technologies
www.trittontechnologies.com
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

OCZ ProXStream 1000W & Zalman ZM1000-HP

A Kilowatt Cage Match

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$299
OCZ Technology
www.ocztechnology.com
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ZM1000-HP
$269
Zalman
www.zalmanusa.com
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Last month, we rounded up a handful of high-end power supplies, but due to availability issues, a couple of units we planned to include in the article didn't arrive in time for print. A couple of weeks after our PSU roundup went to press, however, both OCZ and Zalman came through with a duo of 1kW units that are plenty powerful for today's most power-hungry rigs.

OCZ Technology ProXStream 1000W

The OCZ ProXStream 1000W power supply has a number of noteworthy features. This unit is equipped with a thermally controlled exhaust fan for quiet operation. It's also equipped to handle multiple graphics cards, thanks to its quad PCI-E power connectors. The ProXStream 1000W also has active PFC and an EMI-isolated casing that features titanium-colored mirrored finish.

Unlike most other PSUs in this class, which have elongated enclosures that could encroach on drive bays or other components, the ProXStream 1000W also sports a relatively compact enclosure that will fit in any ATX case.

Disappointingly, the ProXStream's connector configuration isn't ideal. It's powerful enough for all of today's graphics cards, but this unit doesn't have any 8-pin PCI-E power connectors. For many users, this won't be an issue today, but it may pose a problem down the line when Nvidia's and ATI's next-gen graphics cards hit the scene.

Zalman ZM1000-HP

As its name implies, the Zalman ZM1000-HP is a 1kW power supply. Like most of the company's other products, this PSU is geared for near-silent computing. The ZM1000-HP features a low-rpm, 135mm cooling fan. Low-rpm fans move less air—which can be a problem in some circumstances—but the ZM1000-HP also features a dual-heatpipe cooling system, which efficiently pulls heat away from the unit's internal components. With its unique cooling configuration, heat wasn't an issue with this PSU.

The ZM1000-HP has six independent 12V rails and plenty of cabling for multi-GPU graphics configurations. Note the unit's relatively large size (it's 10.5 inches long), though, which could pose a problem in some cases. The ZM1000-HP also sports a semi-modular cable design. Although the main ATX, EPS 12V, 8-pin PCI-E, and a few 4-pin peripheral and SATA cables are hardwired, the remainder of the connectors are modular.

Overall, we really liked the Zalman ZM1000-HP because of its good complement of connectors, high output, and silent operation. If you need a high-end PSU and value silence, do yourself a favor and check out the ZM1000-HP. ▲

by Marco Chiappetta

PSU Side-By-Side: Specs & Performance

Despite similar continuous wattage ratings, the OCZ ProXStream 1000W and Zalman ZM1000-HP are quite different. These two power supplies differ in almost every meaningful way, be it their number of 12V rails, cable configurations, or fan locations. During our testing, however, both units performed similarly. Both units handled our octo-core beast of a test rig with aplomb, and neither faltered during many hours of testing.

	OCZ ProXStream 1000W	Zalman ZM1000-HP
Rated continuous (W)	1,000W	1,000W
Rated peak (W)	1,024W	1,237W
12V rails	4	6
+12V continuous (A)	20A x 4	18A x 4, 28A x 2
+5V continuous (A)	30A	40A
+3.3V continuous (A)	28A	40A
SLI certified	No	Yes
CrossFire certified	No	No
Max wattage tested	734W	729W
Case temp as tested	62 C	63 C
Power factor as tested	0.99	0.99
Efficiency rating (as advertised)	80%+	86% max
Modular cables	No	Yes (partial)
Cable side	Side panel	Motherboard
Fan(s) location	Back	Bottom
Fans	1 x 80mm	1 x 130mm
Miscellaneous	WEEE, RoHS, EPS 12V v2.91	WEEE, RoHS, EPS 12V v2.92
PCI-E 8-pin	0	2 (6+2)
PCI-E 6-pin	4	2
Main 12V	20+4 pin	20+4
8-pin EPS12V	1	1 (2x4)
4-pin 12V	1	2
SATA	6	12
Molex 4-pin peripheral	6	10
Floppy 4-pin	2	2
Finish	Titanium Mirror Finish	Black Mirror Finish
Length including cable bend (in inches)	7	10.5

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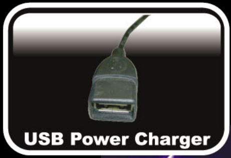
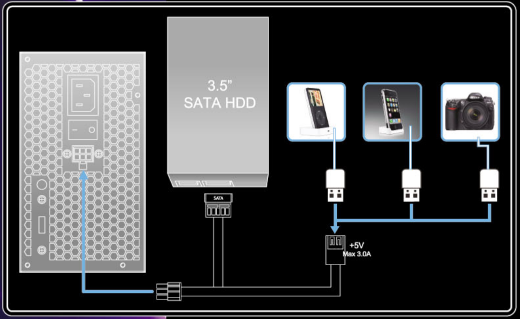
- Power Charger for USB device
- SATA Power for external SATA Hard Drives

SATA Power for external SATA Hard Drive.



Power Charger for USB device...even when system is OFF.



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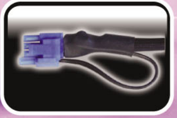

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Gigabyte GA-MA78GM-S2H

Hybrid Graphics, Courtesy Of AMD's 780G

AMD has set its sights on the HTPC market with the AMD 780G (and 780V) chipset. AMD's goal is to produce power efficiency, silent operation, and more-than-adequate support for casual gaming right out of the box.

The 780G is designed for Socket AM2+ processors and comes with Radeon HD 3200-integrated graphics. (Radeon 3100 accompanies the 780V chipset.) HD support up to 1080p; native DVI/HMDI, VGA, and DisplayPort adapters; and Avivo HD technology with UVD are all built onto the IGP. (*Note: DisplayPort is absent on the GA-MA78GM-S2H.*) The northbridge also supports PCI-E 2.0 x16 and up to six PCI-E x1 slots. (The Gigabyte mobo only had one PCI-E x1 slot.) For gaming, DX10 is built into the chipset.

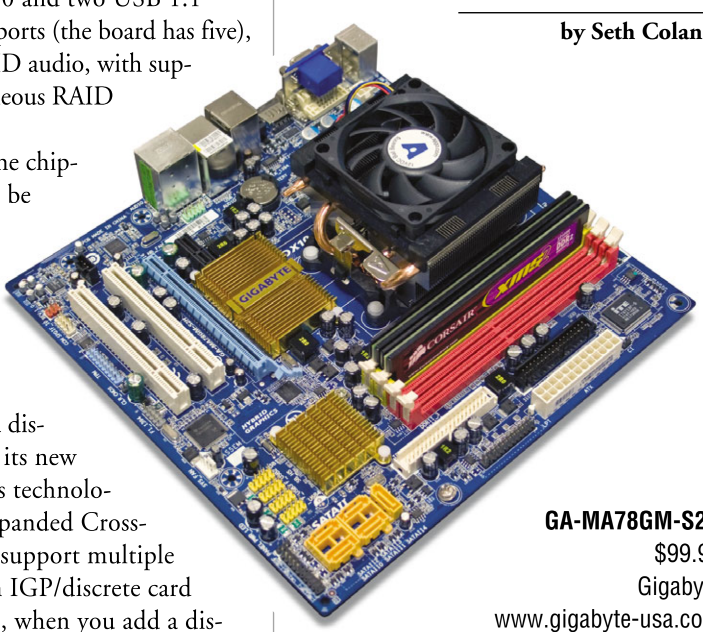
The southbridge packs in support for up to 12 USB 2.0 and two USB 1.1 ports, six SATA ports (the board has five), and integrated HD audio, with support for simultaneous RAID and IDE setups.

The IGP on the chipset is designed to be powerful enough to handle HD and mainstream gaming by itself, without the need of a discrete card. With its new Hybrid Graphics technology, AMD has expanded CrossFire to not only support multiple cards but also an IGP/discrete card tandem. As such, when you add a discrete card to the system, the IGP will add to the card's firepower instead of yielding to it.

AMD sent us a 780G-powered Gigabyte mATX GA-MA78GM-S2H motherboard with an AMD Athlon X2 4850e 2.5GHz dual-core processor. AMD also included a Radeon HD 3450 graphics card and 2GB of DDR2. The rest of our test rig consisted of a 70GB Seagate hard drive and a 750-Watt PC Power & Cooling Silencer. I ran our set of benchmarks on a 32-bit version of Windows Vista Home Premium.

The fans barely made a sound throughout a two-hour HD movie, and the case was only moderately warm afterward. The 780G won't knock your socks off in terms of power, but for what it is—a silent PC that will offer HD video and adequate gaming performance in your living room—it's well worth the investment. ▲

by Seth Colaner



GA-MA78GM-S2H
$99.99
Gigabyte
www.gigabyte-usa.com
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Specs: Chipset: AMD 780G + ATI SB700; Max memory: 16GB DDR2-1,066 (4 DIMM slots); IGP: ATI Radeon HD 3200; Slots: 1 PCI-E x16, 1 PCI-E x1, 2 PCI; Ports: VGA, DVI, HDMI, 4 USB 2.0, FireWire, Gigabit Ethernet

	Gigabyte GA-MA78GM-S2H	w/ Radeon HD 3450 in Hybrid CrossFire
3DMark06 Pro 1.1		
Overall	1190	2100
SM2.0	386	698
HDR/SM3.0	456	837
CPU	1802	1816
PCMark Vantage Pro 1.0		
Overall	2867	2887
Memories	1598	1572
TV And Movies	2234	2155
Gaming	2101	2027
Music	3146	3171
Communications	2721	2705
Productivity	2646	2940
HDD	2594	2587
Dr. DivX 2.0.1*	8:43	8:43
WinRAR 3.71*	4:13	3:46
Cinebench 10*		
Multithreaded (min:sec)	3:44	3:44
Multithreaded (score)	3945	3935
POV-Ray 3.7 Beta**	765.16	782.77
SiSoft Sandra Lite XII SP1		
Processor Arithmetic		
Dhrystone ALU (MIPS)	17,248	17,235
Whetstone iSSE3 (MFLOPS)	15,484	15,469
Processor Multi-Media		
Integer x8 iSSSE3 (itps)	47,391	47,420
Floating Point x8 iSSE2 (itps)	52,279	52,173
Memory Bandwidth		
Integer Buffered iSSE2 (MBps)	6,835	6,898
Floating-Point Buffered iSSE2 (MBps)	6,859	6,916
Crysis 1.1	2.47	2.43
World in Conflict (medium, no AA or AF)***	7	13
World in Conflict (high, no AA or AF)***	3	6

* minutes:seconds
** pixels per second
*** Games tested at 1,280 x 1,024

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Anand's Corner

by Anand Lal Shimpi

Understanding Intel's Atom Processor

Intel has a new chip called the Atom. Internally, it's called Silverthorne, but for the next few years at least, you'll know it as the Intel Atom processor.

As its name implies, the Atom is small—Intel's smallest x86 processor to date. With a die surface area of only 25mm^2, the Atom is made up of 47 million transistors built on Intel's current 45nm manufacturing process. With Intel's Core 2 processors easily pushing five to eight times the die size and transistor count, the name Atom is very fitting.

Intel's Atom is a very simple design; it's a two-issue, in-order core with support for SMT (Simultaneous Multi-Threading). All modern-day Intel and AMD x86 microprocessors can execute instructions out of program order in order to extract maximum instruction-level parallelism. The instructions are decoded in order but executed out of order and then reordered upon retirement so the software doesn't know anything ever happened. While this approach yields the best overall performance when presented with a variety of software applications from different compilers, it is not the least power-hungry. Before out-of-order execution, microprocessors simply executed instructions in the order they were decoded, hence the term in-order execution.

Intel's last in-order desktop CPU was the original Pentium, but back then it was built on a much older microarchitecture, on a much larger fab process. When Intel's Silverthorne team was tasked with building a very low-power, low-cost microprocessor core, it quickly concluded that in-order was the way to go if it wanted to meet aggressive power, performance, and cost targets.

The power had to be under 2W and, more realistically, under 1W. Idle power had to easily scale down to tens of milliwatts. Performance needed to be good enough to run complex applications, as some implementations of Intel's Atom would eventually run Vista. And cost needed to be low; the Atom would be Intel's answer to ARM procs used in cell phones and consumer electronics. In those types of devices, the consumer doesn't worry about the cost of the CPU because it's negligible compared to the cost of the device itself.

The Atom manages to meet all of these requirements through clever engineering, as well as good utilization of Intel's latest manufacturing process. The two-issue, in-order design made sure that the CPU would be small and thus cheap. Thanks to a deep pipeline (16 stages), two-way SMT, and fast-switching 45nm transistors, Intel was able to get clock speeds high enough to make the Atom as fast as the original Pentium M processor (although not clock for clock).

The Atom's importance doesn't really become clear until its second or third iteration. Currently, while the CPU is a good enough performer for its applications, the overall platform isn't power-efficient enough to be used in something like the iPhone. The next iteration of the Atom will begin fixing this, and the version after that should be well suited to powering the iPhone's eventual successor. Realistically, you're looking at a minimum of three years before Intel's Atom can make a serious dent in the smartphone/CE markets.

Until then, expect to see the Atom in what Intel is calling MIDs (Mobile Internet Devices), which are these Web-enabled, UMPC-like devices used to gain access to email, surf the Web, watch movies, and so on. I've yet to be particularly impressed by any of the Atom-based MIDs that I've used thus far, mostly because I can't justify carrying another device with me wherever I go, and the interfaces on the devices are just not very good.

The Atom and MIDs based on it will be making their debut sometime in Q2 of this year. There is a desktop/low-cost notebook version of the Atom due out in Q2, as well, built on the Diamondville core (nearly identical to Silverthorne, with some minor differences). Again, performance won't be top priority, but you should see it in things similar to the ASUS Eee PC.

Intel's Atom processor has the potential to be the greatest seller (in terms of sheer quantity) out of Intel's entire product line. However, don't expect to be blown away by it initially. We must revisit this discussion in another two to three years in order to really find out how well Intel has done. ▲

Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today, *CBS' "48 Hours," and* Fortune. *His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

Talk back to Anand at anand@cpumag.com

The Shark Tank

by Alex "Sharky" Ross

AMD's 780G Platform

I've been at this PC/gaming journalism gig for some 11 years now in one form or another, whether it's been running a PC hardware and gaming site or in other forms of US/UK print media. In the early days of 3D Graphics technology, when that technology was discrete and you needed a separate 2D card (the good old days?), I was bitten by the pixel and hence all things 3D and gaming are and forever will be my primary passion regarding PCs. Hence, over the years, if there's mention of one particular term that has consistently made me gush with excitement, it's been "Onboard/integrated graphics." Obviously, that's just English sarcasm at work. I used to find previewing experimental USB game-controlling devices that never saw the light of day far more entertaining. I remember cursing onboard graphics in the old days as game developers were delaying releases by months having to spend time pleasing their publisher by lowering the bar down for "scalability." You know when you hear the scream "incoming" in your favorite 3D WWII fps? Well, on-board graphics sent me running for cover, too.

Enter AMD's 780G, an IGP that integrates Shader Model 4.0 and full Direct X10 compliance, a UVD (unified video decoder), one x16 PCIe Gen 2 link, HT 3.0, DVI/HDMI, internal or external TMDS, and DisplayPort capability into one single chip. Borrowing from the RV610 graphics core, the HD 3200 core is actually a fairly recent 3D technology at around nine months old, which is faster than I've ever seen a discrete part trickle down to the on-board ranks before. Manufactured on AMD's 55nm process and running at a leisurely 500MHz, the core sports 40 stream processors, four texture address units, and four render backend units. Performance in today's games is what I'd call acceptable, and especially so when you pair up a Radeon HD 3470 in Hybrid Crossfire mode. For the HTPC buffs, the new UVD video engine supports H.264, VC-1, and has been enhanced for improved MPEG-2 decoding whilst drawing less power. With outputs for DVI, HDMI, DisplayPort, and HDCP, your high-definition needs are well taken care of. The 780G isn't perfect and one of the nitpicks has to be the "new" SB700 (SB600 shrunk) south bridge. It's a bit of a clunker and still carries all the AHCI nuances from the previous SB600 generation.

780G-based platforms from Gigabyte, ASUS, and the usual crew come in the perfect small-form factor size and for $100. The 780G's north bridge and its HyperTransport 3 link is scalable enough to support the new Phenom processors, so horsepower shouldn't be a problem. With an Athlon X2 4850e, the TDP is an incredibly efficient 45W and yet Blu-ray and its 1080p goodness are stellar. Eleven years have passed, and dare I say that things are actually heading in a decent direction when it comes to on-board graphics? Home Theater PCs are all the rage, and having a pair of GeForce 8800 Ultras and a noisy 1,000W PSU isn't exactly what I have in mind for the living room. For now, AMD's 780G fits the bill perfectly.

At the recent CeBit show in Hanover (funnily enough, my least favorite trade show ever), Intel really started to flex its G45 platform, showing the company's lofty intentions for the IGP and HTPC sectors. I can't ever remember thinking of the words "acceptable" and "performance" in the same solar system as integrated graphics, nor can I remember the likes of Intel seriously attempting to compete when it comes to graphics. Or maybe I'm just getting IGP-senile. But perhaps with AMD's latest release and Intel's intentions, the graphics industry might be getting a wake-up call down at the entry level, not to mention in my living room. AMD needs a bit of a kick-start as it's not been the best couple of years for it, and with the 780G AMD, is actually first to the market with a very trendy HTPC part. ▲

Email me at sharky@cpumag.com

Disrupting Reuters' newswire with a cheery Christmas greeting at age six, Alex "Sharky" Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he's not tweaking PCs.

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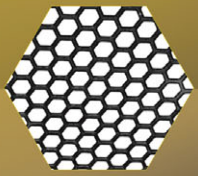
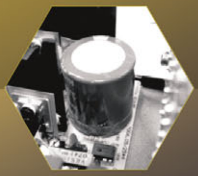
	Plus certificate PSU (Average efficiency: 84%) **Seasonic M12II-500**	Non-80Plus certificate 500W PSU (Average efficiency: 68%)
AC Input	**595W**	**735W**
DC Output	**500W**	**500W**

Note : In order to generate 500W of energy, Seasonic PSU only needs 595W of AC input compared with other non-80Plus certificate PSU that needs 735W of AC input. In short, choosing Seasonic PSU will save you 140W just right there!

Seasonic Blue Badge

Advanced Circuit Design


Honey Comb Structure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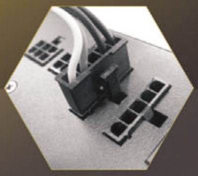
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Mods & Ends

Razer Boomslang Collector's Edition 2007

No doubt, the name "Boomslang" conjures nostalgic feelings in many longtime PC gamers. Back in 1999, Razer introduced the first Boomslang mouse to rave reviews, which cited its solid design and high precision. Here we are, nine years later, and Razer has decided to resurrect the Boomslang with an updated model that has been retrofitted with modern technology.

Only 10,000 Boomslang Collector's Edition 2007 ($99.99; www.razerzone.com) mice will be made for this limited release. Unlike the original, which featured an antiquated ball-tracking mechanism, the Boomslang CE 2007 features Razer's Precision 1,800dpi 3G infrared sensor. The mouse also sports a 1,000Hz polling rate with a fast 1ms response time, 32KB of Razer Synapse on-board memory (to store user profiles), five independently programmable buttons, and on-the-fly sensitivity adjustments. Essentially, the Boomslang Collector's Edition 2007 is a modern gamer's mouse in the body of the classic Boomslang.

Razer has resurrected the classic Boomslang design with a newly released collector's edition mouse that's sure to please gamers.

Thermaltake BlacX

If you've ever needed to access files on an internal hard drive that wasn't installed in a system, then you understand the hassle involved. You have to open the case, find some spare cables, make the data and power connections, and hope that your mobo doesn't rearrange your system's boot order and that the OS recognizes the drive properly—not exactly the most convenient process. Thanks to Thermaltake, however, accessing files on removed internal hard drives has never been easier.

Thermaltake's BlacX SE ($39.99; www.newegg.com) is a SATA-to-USB hard drive dock that makes connecting an internal hard drive incredibly easy. Keep the dock plugged into a USB port on your system (and into an electrical outlet, as it is not bus-powered), and all you have to do is drop a hard drive into the slot. The BlacX will work with any standard 2.5- or 3.5-inch internal SATA hard drive and is hot-swap compatible. We can see DIYers and repair techs lusting over this baby.

Thermaltake makes it easy to pull data off of any internal hard drive with the BlacX SE.

Moixa USBCell

Few things are more annoying than firing up your rig only to find out that the batteries in your wireless keyboard or mouse have died. Instead, keep a set of replacement batteries at arm's reach, with Moixa's innovative USBCell rechargeable AA batteries ($19.98; www.usbcell.com).

Moixa's USBCell AA batteries feature an integrated charger that draws power from a USB port. Simply plug in the USBCells, and they'll be fully charged in just over five hours (according to Moixa). Moixa also claims that plugging the batteries in for a few minutes will give them enough juice to power most input devices for a few hours. They're definitely a handy, eco-friendly product for users who burn through batteries.

You'll never worry about dead batteries in your wireless mouse or keyboard again, thanks to Moixa's USBCell batteries.

Fashionably Fresh Firmware

Linksys WRT55AG (v1.79)

Linksys released an update to the WRT55AG wireless broadband router that corrects a problem when a Radius server is connected to a router's Internet port. It also fixes a Web-based UI display issue when accessing the router remotely and eliminates an interoperability problem with certain legacy 802.11b clients.

www.linksys.com

iZak Portable Media Center (v2.0.0.75)

An update for the iZak Portable Media Center adds support for an array of newer, high-capacity Western Digital hard drives.

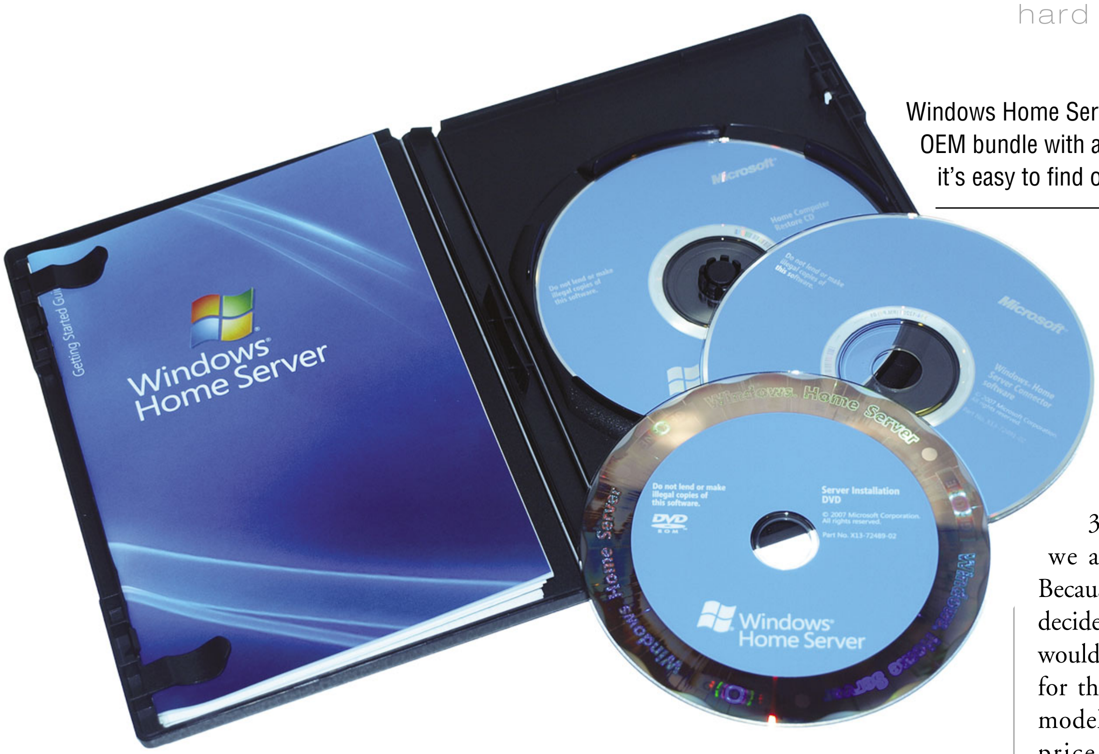
www.unibrain.com

Optiarc AD-7201 S-ATA (v1.05)

A new firmware update for the Optiarc AD-7201 SATA DVD burner enhances the drive's compatibility and write performance with an array of recordable media.

www.sonynec-optiarc.com

by Marco Chiappetta



Windows Home Server is supposed to be sold as an OEM bundle with at least one piece of hardware, but it's easy to find online as a standalone purchase.

DIY Windows Home Server

A Power User's Server On The Cheap

With all of the negative press Microsoft has received for Windows Vista, it's hard to believe that one of the company's best-reviewed products of the year was an operating system. Vista's woes have somewhat overshadowed the news of Windows Home Server's release, but WHS is a product that has mass appeal, with features that are sure to please casual and power users alike. A problem with WHS, at least initially, was that it was only available on some relatively underpowered, prebuilt machines that included only minimal storage. Recently, however, OEM versions of WHS have become available at online retailers, making it possible to design and build your own WHS machine. So, of course, we decided to take a stab at it ourselves, to see if we could hang with the big boys.

In our opinion, a power user's WHS machine should be about two things: stability and storage. WHS machines won't be churning through levels in Crysis or encoding massive amounts of video, but they will be serving up media files and backing up a ton of data. Although less important, we also thought the machine should be quiet and have a small footprint. Unlike our "Ultimate" builds where money is no object, we wanted to keep costs to a minimum for this build.

Now Serving: Server Parts

We began by choosing a processor. We wanted an inexpensive CPU with more than enough horsepower for the OS. WHS requires a 1GHz Pentium III or equivalent CPU, but Microsoft recommends a 64-bit Pentium 4 or Athlon 64 CPU. The users manual for WHS also states that future versions "may support 64-bit processors only," even though the current OS is 32-bit. We decided that AMD's least expensive dual-core CPU, the Athlon 64 X2 3800+, would be a good fit. We found the X2 3800+, which has a measly power output of 65W, was available for under 50 bucks. With this price and TDP rating, the X2 3800+ would be an inexpensive, easy-to-cool processor.

Because the Athlon 64 X2 3800+ we chose was an OEM CPU, we also needed to pick up a cooler. Because the chip had such a low TDP, we decided that an inexpensive, silent cooler would work best for this build. We settled for the Thermaltake TR2-R1—an older model for sure—but at about $11, the price was right. And, according to Thermaltake, the cooler's fan puts out only 16dBA, which is whisper-quiet.

Next, we moved on to the motherboard and RAM. We chose our 2007 Socket AM2 motherboard of the year, the affordable Gigabyte GA-MA69GM-S2H (see page 54 in the December 2007 issue of *CPU*), for its high-quality construction and ample features, which included Gigabit Ethernet, AMD's Radeon X1250 IGP, FireWire, and plenty of USB 2.0 ports. In addition to drawing very little power itself, the GA-MA69GM-S2H is also passively cooled, which means it's completely silent. As for the RAM, we went with the least expensive dual-channel 2GB kit we could find from a well-respected manufacturer. Corsair's TWIN2X2048-6400 kit filled the bill nicely and cost just over $50 (or less if you're lucky enough to score a mail-in rebate when you purchase such a kit).

We still needed a case, power supply, optical drive, and hot-swappable storage. The optical drive was an easy choice; we went with an affordable Pioneer DVR-115DBK DVD burner. We were only planning to use the optical drive for the initial WHS installation for backup purposes, so we didn't need to get fancy here.

Choosing a case was a little more difficult. We didn't want a SFF (small form factor) case because we wanted space for multiple hot-swappable hard drive trays.

Our 2007 Socket AM2 motherboard of the year, the Gigabyte GA-MA69GM-S2H returned for our WHS build, along with a bevy of storage options from Western Digital and Icy Dock.

But we also didn't want to use a full-sized midtower. Through some online searching, we came across Rosewill's RZS05, a very affordable enclosure that was smaller (14.2 x 7.3 x 17.8 inches [HxWxD]) than a traditional midtower case. And the enclosure's unusual mounting position for the PSU at the lower-front of the case would help keep noise to a minimum. The Rosewill RZS05 isn't on the same level as high-end enclosures from companies such as Silverstone, Lian Li, or Cooler Master, but it served our needs perfectly for this build.

Our decision to go with the Rosewill RZS05 helped determine our PSU and removable drive tray choices, as well. Because the case can only accommodate a traditional, smaller-sized ATX PSU with a rearmounted fan, we chose an affordable 300W Enermax EG301P-VB unit that had the right physical dimensions. 300W may seem underpowered in today's world of 1kW+ PSUs, but that's more than enough juice for our WHS rig. In fact, when our rig was fully assembled, it consumed only 86 watts while idling and only 130 watts under load, which affirmed our decision. As for the removable drive trays, we opted for Icy Dock's MB453SPF-B Multi-Bay insert. The Icy Dock MB453SPF-B fits in two 5.25-inch drive bays and can accommodate up to three SATA hard drives, which was perfect for our system.

Finally, we needed to settle on the hard drives. We wanted fast, high-capacity drives that were also power-friendly. For the main OS drive, we chose a 500GB Western Digital Caviar SE16; for the optional drives that would reside in the Icy Dock insert, we went with two of WD's Caviar Green Power 1TB drives, which not only perform well but also spin down to lower spindle speeds for reduced power consumption and wear on the drives.

Our fully assembled WHS rig stands only 14 inches tall, and, thanks to some strategically placed zip ties that keep all of its cabling out of the way, its internal components are completely free of obstructions.

Assembly Required

We didn't take any extraordinary steps during the assembly, but we did apply many intermediate mods to ensure the machine would perform at its best. Using techniques we've discussed in past issues, we lapped and polished both our processor's integrated heat spreader and our Thermaltake cooler's base for optimal contact, which would aid in heat transfer. We also removed all of the motherboard's stock heatsinks, cleaned and polished their bases, and reinstalled them using a high-quality, silver-based thermal paste. We mounted the motherboard and power supply using the standoffs and other hardware included with the Rosewill case. Finally, we connected all of the cables and routed them through the case to be as neat and out of the motherboard's way as possible. Every single cable was twisted or zip-tied in place to ensure nothing would loosen due to vibration.

We should note that we only mounted a single hard drive (the 500GB OS drive) in the case itself. We installed the remaining hard drives in the Icy Dock MB453SPF-B's individual trays. One extra step we did take, however, was numbering each of the SATA cables within the system and connecting them to the appropriate connectors on the Icy Dock MB453SPF-B. With the cables numbered and connected to similarly numbered SATA ports on the motherboard and drive trays (motherboard SATA port 1 connected to tray 1 in the Icy Dock MB453SPF-B, for example), it would be easier to identify a bad drive in case of a problem. With this, the machine was fully assembled; all internal components and cables were held securely in place; and there were no obstructions that would hinder airflow through the case.

You may be wondering why we didn't set the drives up in a RAID array for some redundancy, and the answer is that we didn't need to. WHS uses a proprietary method that allows multiple drives to show up as a single large volume to clients connecting to the server, and it also has built-in redundancy to protect against loss of data.

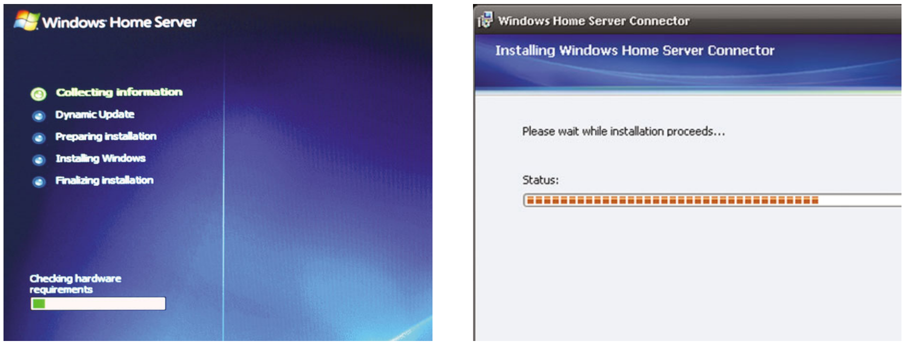
The Software Setup

With the hardware fully assembled, we were ready to install WHS and get down to business. WHS needs to be installed in two parts: the server installation and the workstations installation (or installations). Microsoft did a great job simplifying the process so that anyone with a basic knowledge of operating systems can complete the installations. The server installer is much like Vista's and requires minimal user input. And the "Connector" installation, as it is known, must be run on each workstation but requires little more than popping in the CD and following a few on-screen prompts. Just make sure all of the machines are connected to the network.

In Conclusion

Once we had installed WHS itself, as well as the necessary Connector software on each of the clients, it was simply a matter of running a few wizards and telling the software what we wanted to back up and when we wanted to back it up. With the server in place, configuring WHS is very easy. In fact, we'd argue that configuring WHS is even easier than some external hard drives or standalone NAS devices. And using our guidelines, it's relatively affordable to build a WHS machine for just a few hundred bucks. If you're thinking about purchasing a NAS box or external hard drive for backup purposes, do yourself a favor and consider WHS. Our setup offers not only centralized backup but also health-monitoring services, printer sharing, media streaming, and much more. ▲

by Marco Chiappetta



Please wait while installation proceeds...

With our hardware assembled, we only had to install Windows Home Server, connect it to the network, and install the Connector software.

How'd We Do?

As we mentioned in the beginning of this article, Windows Home Server spent some of its early life available exclusively on prebuilt systems. Arguably the most popular of these systems came from HP, in the form of its MediaSmart Server.

At the time of this writing, HP offered the MediaSmart Server EX475 for $749.99 direct from hpshopping.com. That machine ships with 512MB RAM in a single-channel configuration, a 1.8GHz, single-core Sempron processor, and dual 500GB hard drives for a total of 1TB of storage. (An EX470 with 500GB of storage was available for $599.) In comparison, we think we did pretty well considering our Windows Home Server rig was built with off-the-shelf components.

Looking at the complete breakdown of parts we used for our build, it's obvious that our machine has significantly more processing power. But it also has quadruple the amount of RAM and superior connectivity options, thanks to its full-featured motherboard. Some may argue that a WHS machine doesn't need much processing power, and they'd be right. But with a more powerful CPU that has a larger cache, in addition to the extra RAM (which offers more bandwidth, thanks to a dual-channel configuration), data transfers will be more consistent when multiple machines access the server. WHS processes such as health monitoring and media streaming will have additional resources at their disposal, too.

Our WHS build came in at $1,357.91, but this included 3.5 times as much storage as the MediaSmart EX475. Because the system was equipped with an Icy Dock MB453SPF-B Multi-Bay drive insert, we slapped in a trio of Western Digital Caviar GP 1TB drives ($239 each) for a cool 3.5TB of storage. The additional storage obviously made the price of the rig skyrocket, but keep in mind that we could have just as easily used more affordable, lower capacity hard drives. ▲

Component		Price
Processor	AMD Athlon 64 X2 3800+ (65W)	$47.99
CPU cooler	Thermaltake TR2-R1	$10.99
Motherboard	Gigabyte GA-MA69GM-S2H	$79.99
Memory	Corsair TWIN2X2048-6400	$53 ($25 MIR)
Optical drive	Pioneer DVR-115DBK DVD-R	$29.99
Main hard drive	Western Digital Caviar SE16 500GB	$104.99
Secondary hard drive	Western Digital Caviar Green Power 1TB (3x)	$717
Case	Rosewill RZS05	$29.99
Power supply	Enermax EG301P-VB 300W	$39.99 ($15 MIR)
Removable drive trays	Icy Dock MB453SPF-B Multi-Bay	$73.99
Software	Windows Home Server OEM	$169.99
Total:		**$1,357.91**

Mad Reader MOD

Blast From The Past

We'll admit it: We have a soft spot in our hearts for nostalgia. That's why Rod "[TB] Rod" Rosenberg's "Trash80" caught our eye at PDXLAN 11 and kept us coming back to inspect one more detail or ask one more question. In the end, Rosenberg's craftsmanship and ability to construct a solid system while preserving a vintage piece of computing yesteryear snared him first-place bragging rights.

Rosenberg started with an age-old TRS-80 Model III. This wicked dual-drive behemoth debuted in 1980 with a 2.03MHz CPU. (That's right, 2.03*MHz*.) Rosenberg decided to dispatch with the original hardware, save the case and keyboard, and give the TRS-80 an update with modern components.

The Trash80's hardware won't win any benchmark drag races, but it's light years (think Hubble telescope distances) ahead of the TRS-80's original guts. A dual-core AMD Athlon 64 X2 running at top speed rests in an Abit AN-M2 motherboard, complete with 3GB of OCZ Platinum system memory. (Rosenberg intended to install 4GB, but one stick was DOA.) An Evga GeForce 8800GT, 500GB Western Digital hard drive, Plextor 716-AL, and 700-watt FSP power supply round out the Trash-80's standard components.

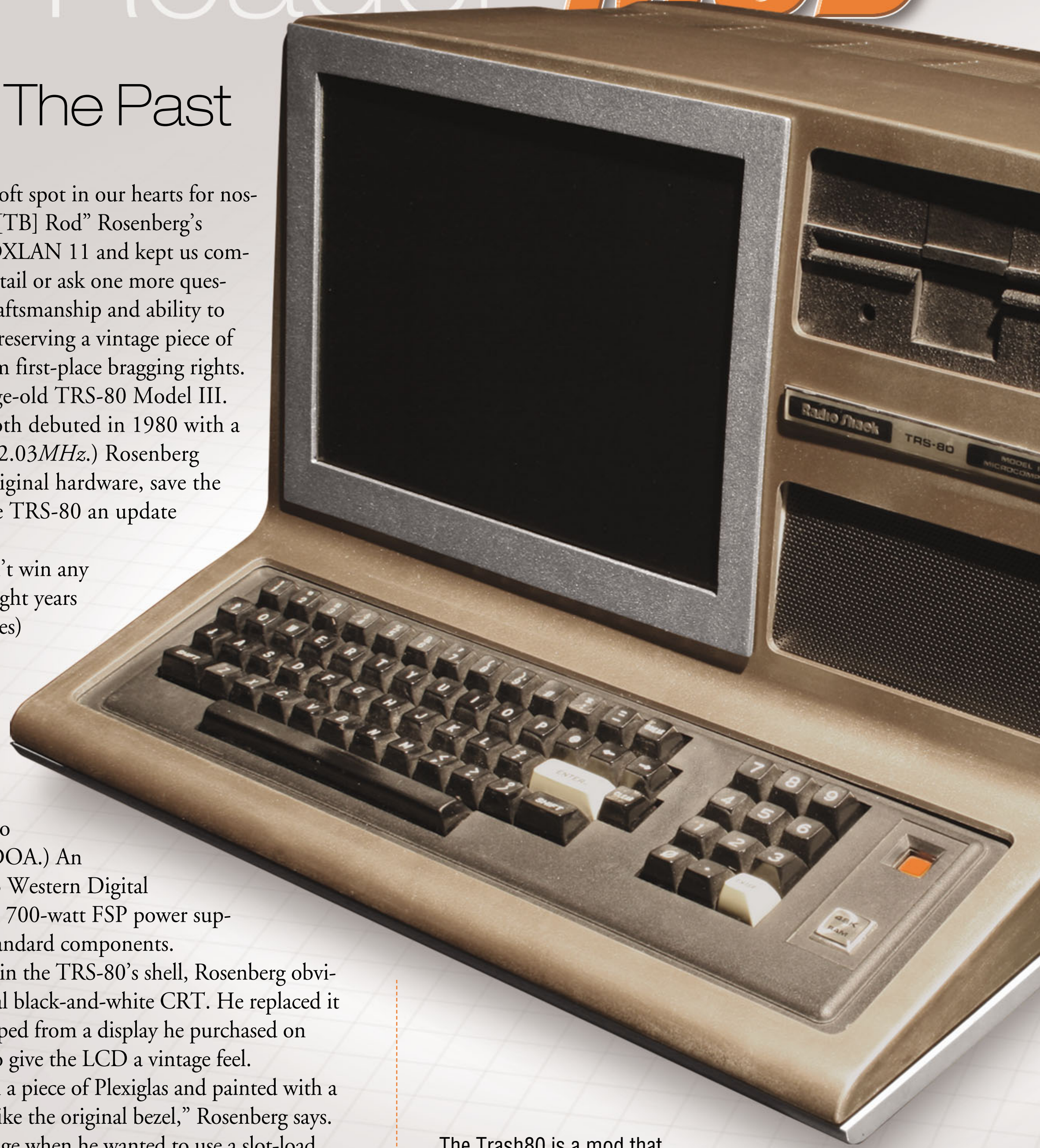
To fit these components within the TRS-80's shell, Rosenberg obviously had to dispatch the original black-and-white CRT. He replaced it with a 12.1-inch LCD panel ripped from a display he purchased on eBay. Rosenberg then decided to give the LCD a vintage feel.

"The front bezel is made with a piece of Plexiglas and painted with a textured paint to make it more like the original bezel," Rosenberg says.

Rosenberg also faced a challenge when he wanted to use a slot-load DVD burner behind the TRS-80's original floppy drive faceplate. He wanted a Plextor 716-AL, an internal IDE drive, but couldn't find any in stock. Rosenberg eventually got his wish but first had to buy an external drive, then crack it open and remove the IDE drive.

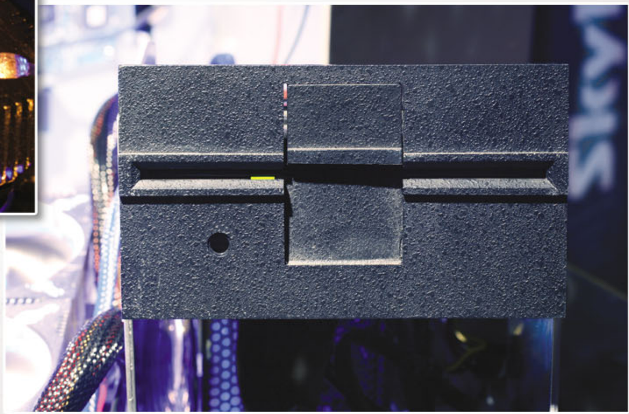
After logging over 150 hours to assemble the Trash80, Rosenberg adds time was more valuable than money. "Money isn't everything when it comes to a good mod," he says. "This mod didn't cost much more than a normal computer with the same specs, but it did take tons of time." ▲

by Vince Cogley

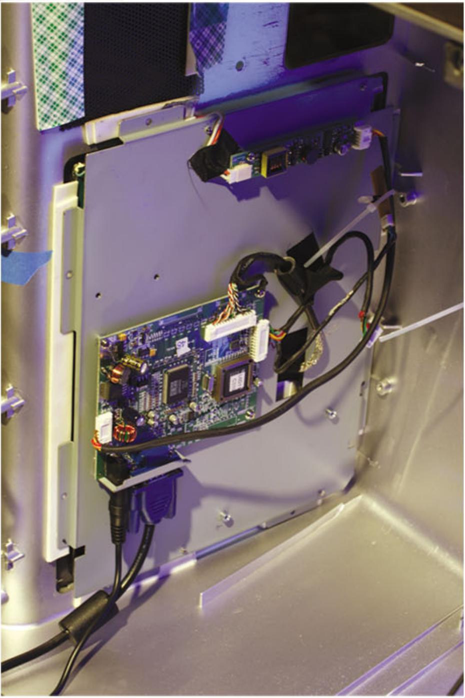


The Trash80 is a mod that will likely make old-school computing purists weep (not to mention any Radio Shack veterans who saw the release of the original system), but we like it. Rosenberg enlisted the help of a local machine shop to cut the aluminum chassis and weld the uprights that hold the DVD burner.

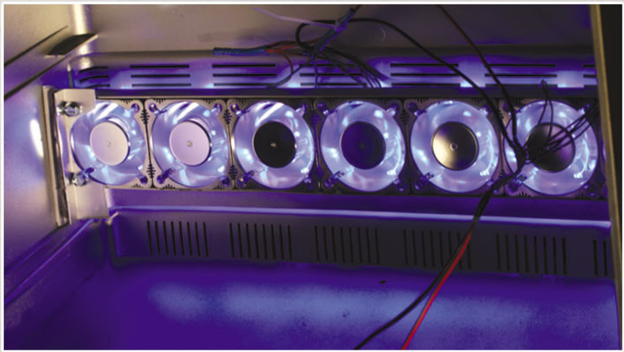
A pair of 120mm Evercool fans move ample amounts of air around the CPU and give off an awesome neon-blue glow. "I love the Evercool fans and the monster [Cooler Master] GeminII 2 heatsink," says Rosenberg.



Behold the soft glow of an optical drive hidden behind the façade of an old 5.25-inch floppy drive. Rosenberg had to jump through a few hoops in order to land the slot-load DVD burner he wanted. "My one plea to drive makers is to please bring back the slot-load in SATA!" he says.



To replace the TRS-80's old CRT, Rosenberg cannibalized an LCD panel and the necessary circuitry. "The LCD is hooked to the onboard GeForce 7025 and will work fine as the primary monitor," Rosenberg says. "It's a 12.1-inch LCD that I found on eBay. I cracked open the black plastic bezel, removed the circuit boards, and attached them to the back of the panel. Then, I modified a couple mounts to make it fit and mounted it to the case."



To match the 120mm Evercool fans, Rosenberg added an array of seven 60mm aluminum Evercool fans. Then, he linked the fans' speed and brightness to the TRS-80's original brightness and contrast controls for its 12-inch CRT. Rosenberg adds that while the keyboard doesn't currently have any backlighting, he hopes to add some in the near future.

Give Us Your Mod

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. We're looking for rigs that are recognizable as PCs; your Wookiee mod won't find a home here. If we include your system in our "Mad Reader Mod" section, we'll help you load up your modder's toolbox with $1,500 and a one-year subscription to *CPU*.

Revenge Of The LAN

PDXLAN Is Back & Bigger Than Ever

To keep gamers fragging away into the wee hours of the morning, a plentiful supply of surprisingly tasty Brawndo was on hand to quaff.

The day before PDXLAN 11, organizer Matt "Vector" Conwell feels the calm before the storm. His crew of stalwart volunteers has laid the infrastructure that will soon be host to hundreds of energetic gamers, eagerly awaiting the moment they'll be able to go head-to-head against each other in FPS and RTS games for the entire weekend. He looks around at the vendor booths, projection screen, and seemingly endless rows of folding, laminated tables and realizes that for the next 72 hours, he will face a relentless pizza-consuming, Brawndo-guzzling, game-playing war machine of PC gaming enthusiasts. When Conwell speaks, though, you feel as though you're talking to a man who treats this impending chaos as just another day at the office.

It makes sense: You see, LAN events like PDXLAN *are* just another day at the office for Conwell, who organizes PDXLAN and several others across the country as his day job. Lining up sponsors, finding volunteers, and securing food vendors are just some of the logistical ducks Conwell has to get in a row. Suddenly, the idea of planning huge LAN parties for thousands of fervent gamers across the country doesn't sound so glamorous. But Conwell doesn't mind. After all, Conwell built PDXLAN his way, and the proof of his success is evident in the development of this Portland, Ore. gathering.

Humble Beginnings

Conwell's LAN experience began the same way as so many other seasoned LAN veterans: a small gathering at a

Intel, a PDXLAN event sponsor, was back with its usual alcove of gaming systems ready for passersby (and *CPU* staff) to sit down for a few minutes of action. Desktops and laptops were available.

house. (In this instance, Conwell hosted 20-person LAN parties at his house.) After enjoying hosting small, intimate parties at home, Conwell decided it was time to expand—and in a big way.

Once he decided to stage a major event in Portland, Conwell contacted the CPL (Cyberathlete Professional League; www.thecpl.com) with the hope that the organization would sponsor a massive LAN. But CPL declined, saying the city of 500,000-plus "[couldn't] sustain a 500-person LAN party."

CPL's snub turned out to be a blessing in disguise for Conwell, because it let him build an event that had a different focus than the number of gaming tournaments that were so prevalent. Instead of putting the spotlight on an enormous prize pool for the winners of a tournament (and the gamers who consistently dominated them), Conwell decided to focus on every gamer's experience, regardless of skill.

"I realized then, even more so now, that these [CPL] events are not LAN parties," Conwell says. "They are professional tournaments with LAN areas to practice in before matches. Once a team is eliminated, they tend to pack up their sponsored hardware and head out."

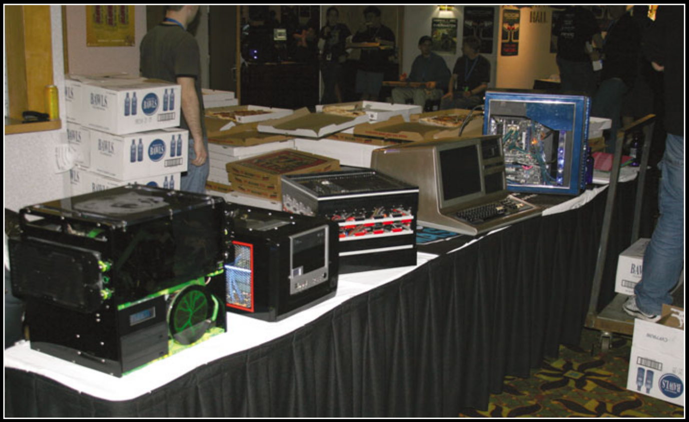
PDXLAN, which focuses on fostering the gaming community as a whole, is working. PDXLAN has sold out every time; the most recent LAN, PDXLAN 11, sold out nearly two months before the event—a record sellout. PDXLAN 12 has already shattered that, selling out a full four months before it kicks off in July.

Although Conwell regularly turns away more than 200 attendees, he has no plans to grow PDXLAN beyond its current attendance cap of 500.

Do you see your next system in one of these cases? Antec showed up to display its wares, as well as give away an assortment of prizes. We should note that Antec's Nine Hundred case should play a prominent role in PDXLAN 12's mod contest.

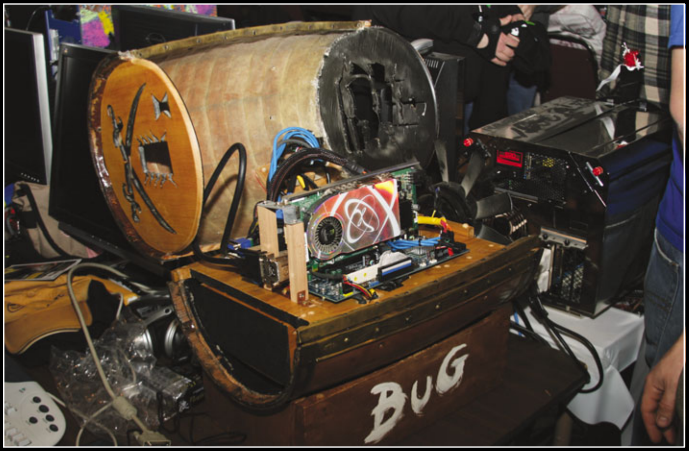
Giant flat-panel displays, while not yet the norm, have been steadily increasing in number with every passing PDXLAN.

World of Warcraft enthusiasts, take heart. Conwell is planning PDXWOW for Azerothian adventurers.



Behold, our winning mods. They are, from left to right: Kit "Crunch" Wiley's Crunch, Justin "CTRL-ALT-DELETE" Diduch's Liquifly, Ty "Bacon0" Kurtz's L390, Rod "[TB]Rod" Rosenberg's Trash80, and Dexter "Dexaroni" Carman's Blue Steel.

Rod "[TB]Rod" Rosenberg was all smiles as PDXLAN founder Matt "Vector" Conwell presented him with his bounty for winning *CPU*'s mod contest.



Hoping for a spiced rum surprise, we weren't too disappointed to see this modded cask hold some spicy components instead.

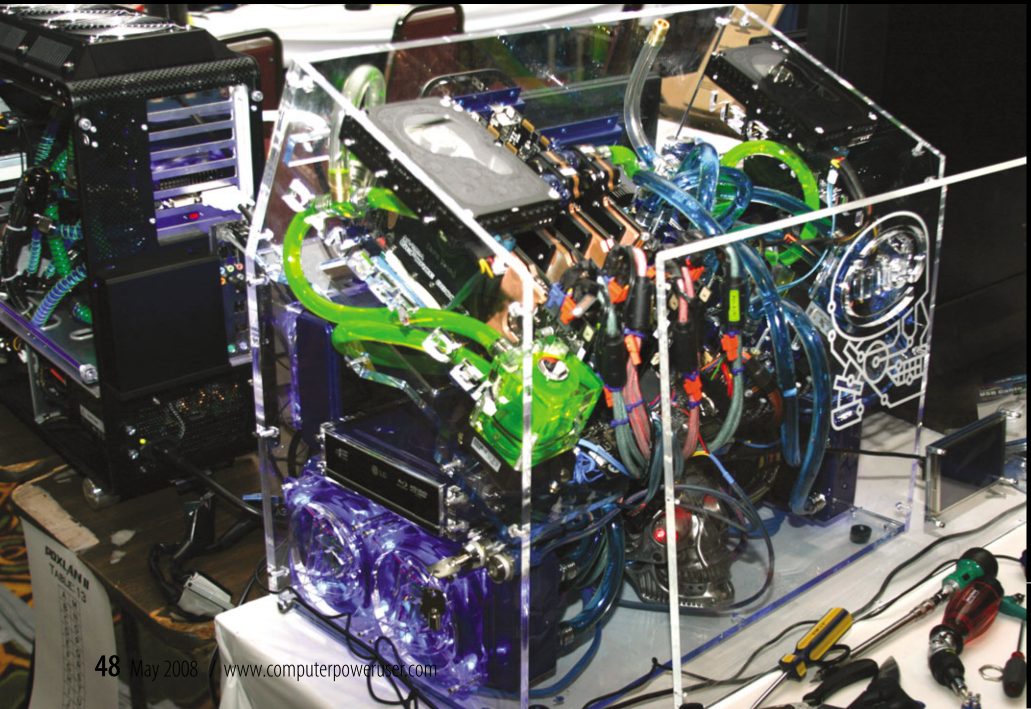
"It keeps the community tighter," says Conwell. "It keeps it a very friendly LAN."

New Developments

Much of PDXLAN 11 remained the same as prior events. Admission was still $60 for the first 400 paid attendees and $65 for the last 100 to pony up their fees. Of course, all attendees received a raffle ticket (the first 400 got two) for sponsor-donated prizes, swag bags from PDXLAN's sponsors, a pizza party, and a dedicated seat to set up their rigs. (Each "station" delivers 3.4 amps of power and a 3-foot-wide table space for hardware.) And tournaments for Call of Duty 4, Crysis, Command & Conquer 3, and even old-school favorites such as Warcraft III were free and plentiful, as always.

This year, a city-spanning scavenger hunt and a Brawndo chugging contest were among the new flavors PDXLAN 11 offered. "I really liked the new scavenger hunt, poker tournament, and Brawndo chugging contests," Conwell says. "It is always fun to get these gamers together and show them a good time. Isn't that what LANs are supposed to be about?"

Richard "DarthBeavis" Surroz didn't enter this year's mod contest, but that didn't stop this PDXLAN regular from bringing along his latest monster (and monstrously intricate) build.



Present & Future Mod Contests

Another of PDXLAN's attractions is the sizable number of breathtaking, modded rigs. The modding clique of PDXLAN's attendees is so strong that *CPU* once again hosted a mod contest to pick the best of the best. This time, Rod "[TB]Rod" Rosenberg's Trash80, a Radio Shack TRS-80 shell with slick hardware underneath the hood, took top honors.

CPU will be back to sponsor PDXLAN 12's mod contest in July, and this one is going to be a little different. We'll give you a hint: Get very acquainted with Antec's Nine Hundred. Inspect every nook and cranny of its chassis, because it'll come in handy.

What The Future Holds

We caught up with Conwell as the PDXLAN cyclone was rolling out of town; Conwell showed no signs of slowing down. The bi-annual event continues to thrive and draw more sponsors.

"PDXLAN's future is to keep doing what we are good at: running fun LAN parties," Conwell says. "It's amazing to see so many hardware companies come to visit PDXLAN just to see our unique way of doing LAN parties." ▲

by Vince Cogley

advanced Q&A corner

Get informed answers to your advanced technical questions from *CPU*. Send your questions along with a phone and/or fax number, so we can call you if necessary, to q&a@cpumag.com. Please include all pertinent system information.

> “. . . in terms of platform longevity, at this point we would suggest going with a board that supports new DDR3 memory.”

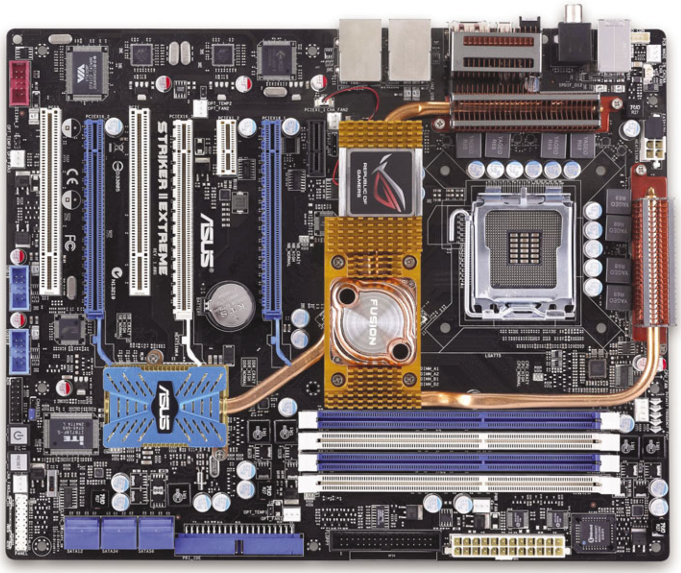
Each month, we dig deep into the mailbag here at CPU *in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable?* CPU*’s “Advanced Q&A Corner” is here for you.*

Topdad asked: I’m in need of some advice regarding motherboards. I am going to upgrade my PC to an Intel Core 2 Quad Q6600/2.4GHz/8MB cache/1,066 FSB, and I’m also getting a GeForce 8800 GT video card. I’m only getting one GeForce 8800 GT card, so I won’t need an SLI-ready motherboard. I’m also getting Corsair DDR2 RAM for it, for a total 4GB RAM at 800MHz C4. And finally, I’m getting a pair of SATA II drives for a RAID 0 array.

The only thing I am having a hard time deciding on is the motherboard. Can you give me some advice on a really good motherboard to match my system specs? I have been using Gigabyte and have had no problems with these types of boards. I assume Gigabyte should be just as good with the Intel CPUs as they are with AMD processors. What I would like is three choices of what you’d consider to be good motherboards for my build. I’m not too worried about price. Currently I have an AMD Athlon 64 +3500 running in a Gigabyte GA-K8N ULTRA-SLI motherboard with a GeForce 7900 GS card and 1GB of RAM.

A: If you’re considering rebuilding on the Intel platform and Nvidia SLI isn’t something that’s important to you, we would suggest you look at either an Intel X38 chipset- or X48 chipset-based motherboard, both of which also support AMD CrossFire multi-GPU graphics, though the base platform makes for an excellent solution, regardless. If you’re inclined to go multi-GPU in the future, however, we’d suggest something from Nvidia’s new 790i chipset offering. All of these motherboard chipsets will offer support for the latest in DDR3 memory technology, as well as PCI-E connectivity for graphics and future compatible AICs (add-in cards), in addition to 1,333MHz and 1,600MHz FSB support for the newest high-end Core 2 Extreme QX9650 and QX9770 Intel processors. Another option would be an X38 chipset-based board with DDR2 memory support.

Our specific picks within these various motherboard camps would be the Gigabyte X38-DQ6, Asus P5E3 Premium (X48), and the Asus Striker Extreme II (Nvidia nForce 790i). The Gigabyte X38-DQ6 might be interesting for you because it offers 1,333MHz FSB support and PCI-E-capable card slots but also supports the legacy DDR2-800 memory. And yes, Gigabyte in general makes great products for both CPU platforms, as long as you’re considering solid, mainstream chipsets, of course.



The Asus Striker Extreme II motherboard is built on Nvidia's latest nForce 790i SLI Ultra chipset and supports 1,600MHz FSB processors, DDR3 memory, and Nvidia's SLI multi-GPU graphics.

However, in terms of platform longevity, at this point we would suggest going with a board that supports new DDR3 memory. If you're interested in only a single-GPU configuration, the Asus P5E3 Premium officially supports Intel's flagship Core 2 Extreme QX9770 processor with a 1,600MHz FSB and is a bit more "future-proofed" in that regard, as well. Though if you're really into gaming and want the best of both worlds, including support for Nvidia SLI, the hot-off-the-press Asus Striker Extreme II will serve as the base of a potent new gaming rig with all the bells and whistles: DDR3, PCI-E 2.0, SLI, and even waterblock cooling on its chipset and MOSFET heatsinks if you really want to go hog-wild.

Tim S. asked: **I've been reading a ton of information about Intel's Skulltrail platform and just don't understand what all the hype is about. It seems to me that Skulltrail is nothing more than a pair of Xeons and a server motherboard branded with a cool-sounding name. Why would Intel go through all of the trouble to promote a so-called "ultimate enthusiast platform" that's made up of nothing more than existing parts with new names?**

A: We understand where you're coming from, Tim. On the surface, it may seem like Intel's Skulltrail platform is made up of existing components, but there are some subtle differences with the processors and motherboard that are the basis of Skulltrail that set it apart from Intel's workstation-class offerings.

Let's start with the Core 2 Extreme QX9775 processors. Unlike Socket 771-based Xeon processors, the C2E QX9775s are unlocked, which makes them easy to overclock—a subtle difference, yes, but something appealing to the few hardcore power users that would consider buying a Skulltrail system. The Intel D5400XS also has some interesting features that differentiate it from all of Intel's workstation- and server-class motherboards. For one, the D5400XS is compatible with more common LGA775 CPU coolers. Intel changed the configuration of the heatsink mounting holes around the D5400XS' LGA771 processor sockets to make the board more appealing to enthusiasts and channel partners. The D5400XS motherboard also features a full suite of overclocking tools in its system BIOS, which is something very few workstation motherboards have. And finally, the D5400XS motherboard is outfitted with a pair of nForce 100 PCI-E switches that allow the board to support Nvidia's SLI multi-GPU technology. Those switches, in addition to the features inherent in the board's Intel chipset, give the D5400XS the unique distinction of being the only motherboard to officially support SLI and CrossFire (at least for now).

The combination of the Core 2 Extreme QX9775 processors and the D5400XS motherboard's feature set, in addition to the platform's very high performance, are reasons Intel is promoting Skulltrail as the ultimate enthusiast platform. ▲

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by Dave Altavilla and Marco Chiappetta,
the experts over at HotHardware.com

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The Curved Monitor

As humans, we rely heavily on our peripheral vision. How many times have you caught a glimpse of something important out of the corner of your eye? Perhaps you've avoided an accident with another vehicle. Or what about that great pass you threw to your basketball teammate in the pickup game last Saturday when you saw him cutting to the hoop? (Never mind that his 50-year-old defender was doubled over on the wing, trying to catch his breath that had last been seen in 1990.)

Peripheral vision could be important in gaming, too, giving you a chance to catch edge-of-the-screen movement and anticipate an opponent's action. However, with a traditional flat computer monitor or TV, the screen is directly in front of you, and your peripheral vision isn't a factor. Your peripheral vision catches everything going on in the room beyond the screen, but it really doesn't come into play in regards to the game.

Wrapping the screen around your field of vision, an idea NEC and Alienware recently showcased at places such as MacWorld and CES, could bring a whole new feel and look to gaming. With the extra-wide, curved screen, your peripheral vision can join the game.

Curves In The Right Places

Both NEC and Alienware are working with Ostendo Technologies of Carlsbad, Calif., to develop the curved monitor. The screen measures 42.4 inches diagonally, and it curves around the viewer, providing an immersive experience.

To create the curved screen, Ostendo chose DLP (digital light processor) technology for the display, which involves rear projection.

"With LCD and plasma, you can't get a continuous curvature," says Erhan Ercan, director of product marketing for Ostendo Technologies.

Richard Atanus, NEC vice president of product development, says that to make a similarly curved LCD monitor, the glass thickness would have to be less than 0.2mm. In the current market, most LCD monitors use glass measuring about 0.7mm in thickness.

"When curving the LCD glass, it becomes too fragile," Atanus says.

Using DLP

The curved display makes use of four DLP projectors, all of which are XGA projectors. DLP monitors usually offer a 1,024 x 768 resolution, but designers turned the projectors vertically and overlapped them to achieve the 2,880 x 900 resolution.

Ostendo decided on the 2,880 x 900 resolution in part because it's double the most commonly used resolution for 17-inch widescreen monitors (1,440 x 900).

"Most graphics cards can support" the resolution, Ercan says, "and have multi-monitor support built in. We certainly have plans dictated by our customers for going into higher resolutions. Our technology is scalable."

The curved monitor makes use of 18 LEDs for the light source (six each of blue, red, and green) per projector, which helps yield extremely fast response times, which range from 16 to 20 microseconds.

"We believe it's the fastest display the market has ever seen," says Patrick Cooper, director of product management for Alienware.

By using LEDs for the light source with DLP, the curved monitor has better contrast and better pixel control than other rear-projection options.

"DLP is a great option to get the speed and form factor that creates this wrap-around effect," Cooper says. "You can't do that today with LCD. It's a changing paradigm for a display. The market is creating generation after generation of the same flat-panel monitors."

Developing The Curved Monitor

Ostendo began working on the curved monitor soon after its founding in October 2005.

"We've focused on a multiprojection display concept," Ercan says. "After

The Curved Monitor

many iterations and discussions, both internally and externally, we believe curving the display gives it the most immersed experience."

NEC has worked with Ostendo for nearly two full years in developing the curved monitor, Atanus says, and NEC will build its own chassis for the products.

Alienware's Cooper says his company had been working on a curved display on its own before connecting with Ostendo.

"The concept of a curved display is not new to us," Cooper says. "We've been imagining a world where the display wraps around you. Displays worn on the head have not been successful yet."

Best of all, all three companies say major updates to games or other software to make use of the curved display won't be necessary. Games with multidisplay support should migrate easily to the curved display.

"We demonstrated it on Crysis with no changes to the game," Cooper says. "Our relationships with game developers will drive feature sets into their products."

Some Drawbacks

During the demonstrations, a few drawbacks became obvious.

✘ The monitor, obviously, is huge. It's not overly heavy, at about 25 pounds, but because of its width and depth, you'll need a lot of desk space to hold it. For those comfortable with the slim, flat-panel LCD designs, this curved monitor is a drastic change.

✘ The best viewing angle for the monitor comes from someone sitting in the middle. The screen isn't viewable from other locations.

"It's not geared to serve multiple people," Ercan says. "It's geared to serve one person sitting directly in the middle."

✘ The demonstration models sometimes showed three distinct lines in the display, matching the areas where the four projectors overlap.

All three companies say the problems with lines will be fixed before the release of the monitors, which will occur sometime in the second half of 2008. (No one we spoke with was willing to narrow down the release time frame.) Although "the amount of customization will determine the exact [release] schedule and cost," Ercan estimates that the curved monitors will cost $5,000 to $6,000.

"Basically, what we were looking at was obviously this product will be going after the high end of the market," Ercan says. "We are only looking to address those who have needs that can take advantage of the curve and the response time."

Curved Monitor Specifications

The CRVD-42DWX+ at a glance (even out of the corner of your eye).

Model	CRVD-42DWX+
Native resolution	2,880 x 900
Diagonal measurement	42.4 inches
Screen dimensions	40.4 x 12.6 inches
Response time	0.02ms
Number of colors	68.7 billion
Dynamic range	12-bit, 4,096 levels
Contrast ratio	10,000:1 (minimum)
Brightness	350 nits
Aspect ratio	3.2:1
Pixel pitch	71dpi, 0.36mm
Weight	25lbs

Sources: Ostendo, Alienware, NEC

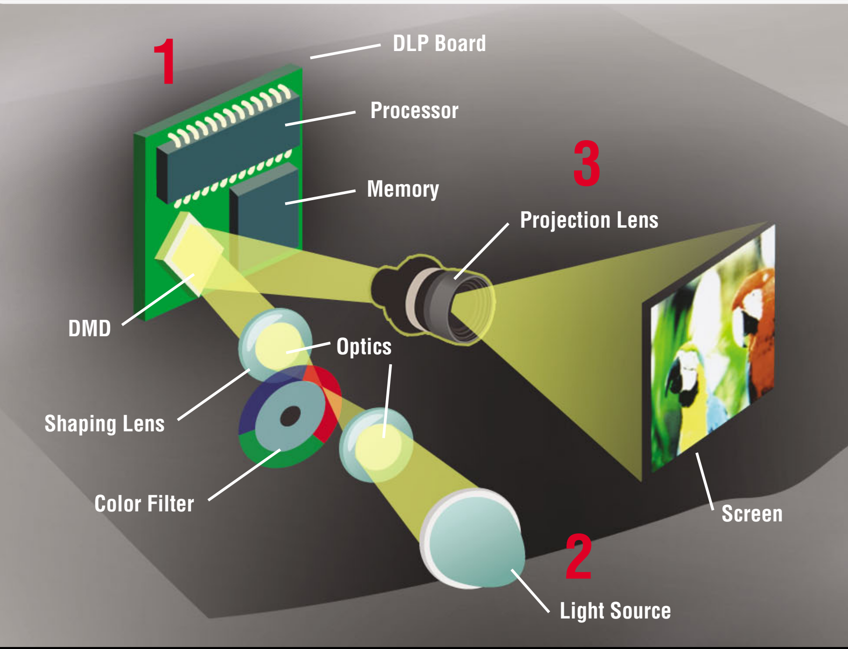
NEC will aim its monitors at professional consumers, with uses in 3D modeling, medical fields, flight simulations, security, and other areas, Atanus says.

In future versions of the curved monitor, NEC plans to increase the height, resolution, brightness, and contrast, Atanus says.

"We're looking for the niche users at the top of the pyramid," Atanus says. ▲

by Kyle Schurman

How DLP Works



Texas Instruments invented the DLP chip in 1987. **(1)** A DLP chip contains up to 2 million microscopic mirrors (sometimes called DMDs, or Digital Micromirror Devices) that measure less than 15 microns in width. (Human hairs range from about 50 to 100 microns in diameter. A micron is a millionth of a meter.) The mirrors are hinged and switch "on" and "off" several thousand times per second. Mirrors that are switched "on" more frequently than "off" create lighter shaded pixels; mirrors that are switched "off" more frequently create darker shaded pixels; and mirrors that are continuously off create black pixels. **(2)** As the light source lamp projects light toward the mirrors, the light passes through a color wheel, which filters and mixes the light as it strikes the mirrors to create colors. **(3)** The mirrors then reflect the light through the projection lens onto the screen. ▲

Source: DLP.com

Unplug Your Home Theater

For children, the Sunday newspaper comics section sometimes contains a puzzle where items on the left side of the panel connect to items on the right side through a tangled weave of intersecting lines. You have to concentrate to follow the confusing path of a particular line as it twists among the other lines connecting the other items.

The artists make that puzzle for children, and the reason is obvious: Adults have their own real-life version of the puzzle. Have you looked lately at the snarled nest of audio/video cables behind your HDTV?

Try holding one end of a particular cable and see if you can guess the location of the other end. (Maybe you'll want to employ your kids to help; they might find the puzzle enjoyable.)

If the companies touting the WiHD (WirelessHD) specification are correct in their expectations, though, the days of having knots of cables hiding behind your big-screen TV are nearly at an end. The WirelessHD specification, announced in January 2008, aims to bring a wireless

The WVAN Configuration

WirelessHD will work in a variety of products, allowing for many different configurations within what the WirelessHD organization calls the WVAN (wireless video area network).

HD audio/video source. The HD source can include a Blu-ray player, Blu-ray recorder, HD DVD player, HD DVD recorder, over-the-air HD receiver, personal video recorder, or set-top box.

Audio source. Any HD audio/video component, over-the-air radio receiver, or stereo tuner can be the audio source.

HD audio/video sink. The HD sink, or receiver, can include a Blu-ray recorder, HD DVD recorder, LCD, personal video recorder, plasma display, or rear-projection display.

As shown in the illustrations, the WVAN consists of a Coordinator and Stations. The Coordinator must schedule and prioritize the various audio/video streams, making sure it's using the resources efficiently. Most of the time, the Coordinator is a display, also called a sink, for the audio or video data.

The WVAN works with two types of physical layers, or PHY: High-rate PHY and low-rate PHY.

The HRP (high-rate PHY) supports high data rate throughputs up to distances of 10 meters (about 33 feet). The HRP will support data rates of more than 1Gbps. The HRP will carry isochronous data (such as audio and video), asynchronous data, MAC (medium access control) commands, antenna steering information, and higher layer control data for A/V devices.

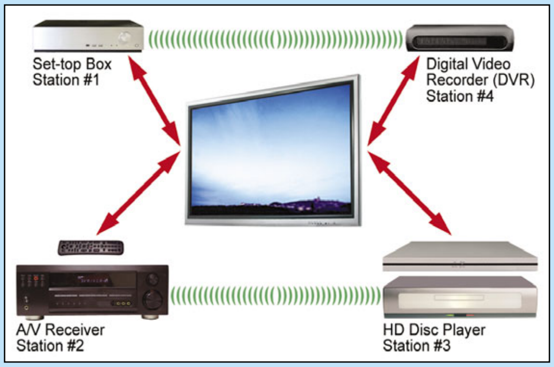
The LRP (low-rate PHY) offers a bidirectional link for lower data rates, which cannot expand beyond about 1Gbps. Higher data rates in the LRP are available, but they must be directional. LRP works for station-to-station links. The LRP will carry low-rate isochronous data (such as audio), low-rate asynchronous data, MAC commands, acknowledgements for HRP packets, antenna beamforming information, capabilities information, and higher layer control data for A/V devices.

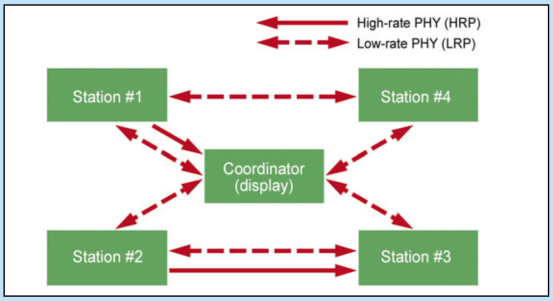
Each device in the WVAN will carry one of four different PHY capabilities:

- **HR0.** A device that cannot use the HRP for receiving or transmitting.
- **HRRX.** A device that only can use the HRP for receiving (not transmitting).
- **HRTX.** A device that can only use the HRP for transmitting (not receiving).
- **HRTR.** A device that can use the HRP for both transmitting and receiving.

All WirelessHD devices can use the LRP for both transmitting and receiving data.

Within the WVAN, some Station components will communicate with each other wirelessly, too, bypassing the Coordinator. The Coordinator also acts as a Station at times, both sending and receiving data when needed. ▲





Coordinator. The Coordinator controls timing in the WVAN, tracks all members of the WVAN, transmits and receives data using the LRP, sometimes transmits data using the HRP, and sometimes receives data using the HRP.

Station. A Station transmits and receives data using the LRP, sometimes initiates stream connections, sometimes transmits data using the HRP, and sometimes receives data using the HRP.

Sources: WirelessHD.org, SiBEAM

high-definition signal transmission standard to consumer electronics.

"A standard is clearly needed, especially if you look at the wires trailing around your living room," says Nick Jones, a VP distinguished analyst with Gartner who focuses on the mobile and wireless markets.

Uncompressed Signals

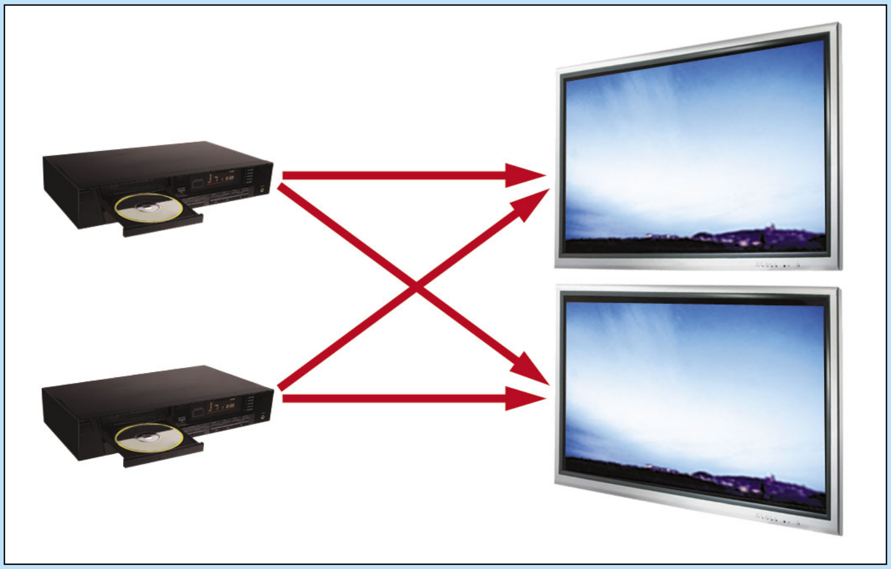
WirelessHD sets itself apart from other wireless standards because it can transmit HD signals without the need for compression. It's the first specification to deal with uncompressed HD video and multichannel audio.

"Streaming uncompressed video, device to device, at 4Gbps and going wirelessly is unprecedented," says John Marshall, chairman of WirelessHD. "We're just happy that on all of these fronts, we're the first."

For consumers, WirelessHD means they will be able to remove the confusing mess of cables that connect various components to an HDTV. Consumers also will be able to move their signal source components farther from the HDTV without worrying about the length of a cable or cord. WirelessHD will work seamlessly with existing wired and wireless display technologies, as well as either mobile or stationary devices, and it can use power management features to help extend battery life for mobile devices.

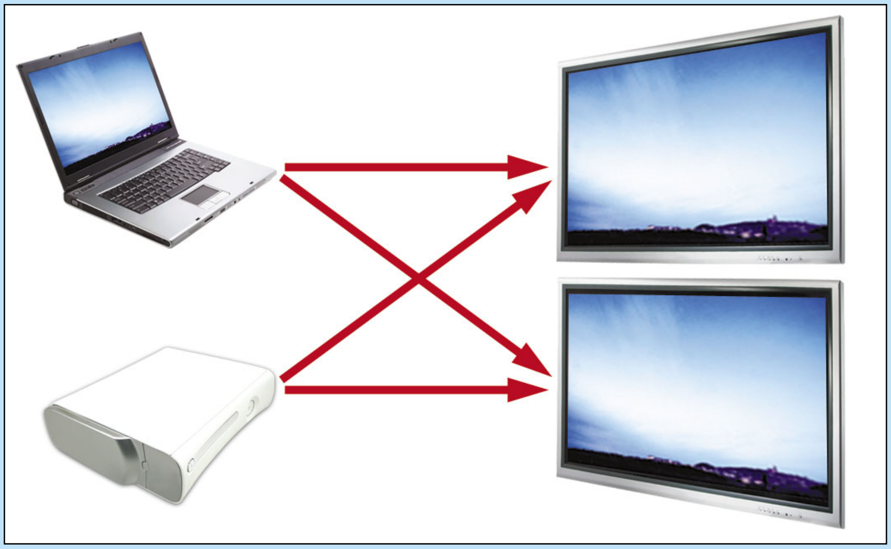
At this point, WirelessHD offers top data transfer speeds of between 2 and 5Gbps. As the technology scales, though, it potentially can achieve data rates up to 25Gbps, which should allow the standard to work with future HD formats that incorporate greater color depth and higher resolutions. (However, Marshall says work on the WirelessHD 2.0 standard hasn't yet begun.)

WirelessHD Usage Scenarios



Obviously, HD systems require high-end resolutions, including 1,920 x 1,080. HD video needs five to 10 times as much bandwidth as standard-definition video. To meet the needs of HD video, most wireless systems have made use of compressed source video because of bandwidth limitations, which causes latency concerns and reduced image quality, both of which are undesirable for a consumer looking for HD-quality video.

WirelessHD's high-end data rates in the 60GHz band work well with HD, allowing for uncompressed video streams, such as between a Blu-ray player or an HD DVD player and an HD display.



Gamers using gaming consoles and laptops would be important beneficiaries of a technology such as WirelessHD. Gamers could move their consoles or laptops from room to room, connecting to an HDTV without the need for cables. Obviously, with games, you must have a low-latency data system to gain the most from the game. WirelessHD has the speed and bandwidth needed to avoid problems with pauses and dropped frames in games.

WirelessHD can support a variety of high-end color and frame rates. Initially, WirelessHD will support 24- and 30-bit color, with a move to 36-bit color in the future. WirelessHD also will support future frame rates as they advance to 100 frames per second and more.

Source: SiBEAM

Q&A With John Marshall

John Marshall has worked with the WirelessHD special interest group since its inception after serving as SiBEAM's co-founder. As chairman of WirelessHD, Marshall has been a key figure in development of the specification.

CPU How important is it to have high-tech heavyweight companies involved in WirelessHD?

Marshall: When you look at what's necessary to create a standard, you have a couple of different paths you can follow. You can use standards bodies, or you can go with an industry standard. But, to have teeth with an industry standard, you'd better have the large companies. You see large companies get involved with many initiatives. If you look at their involvement with WirelessHD, it's encouraging that this technology is viable. It doesn't mean that others aren't, but this one is.

CPU How do you foresee people eventually using WirelessHD?

Marshall: My children and my wife are part of the impetus for WirelessHD. We've had battles in my house over whether the gaming console was going on the big TV upstairs or the little TV downstairs. The family would have a panic because they couldn't climb behind the TV to connect something new because they might trip over the cords and destroy the system or even electrocute themselves. We're avid digital video people, and we want to watch the video after an outing, but we can't find the proprietary cable. It was always such a mess. [WirelessHD] will make it easier for people to use consumer electronics with other consumer electronics without concern for the complexity of the connection.

CPU What about competing technologies? How do they affect WirelessHD?

Marshall: It's not enough for it to be a technology that's good for an application, but you need to pick a technology that's great for an application. Others are good for some things. But for uncompressed, high-quality HD video and audio, they don't have the data rate to meet the needs. When you look at wireless technology options, there's only one solution that is able to provide this type of audio and video service, and that's WirelessHD. That doesn't mean the others aren't good, but WirelessHD is the best. At 4Gbps, nothing else could reach that data rate.

CPU What's the next step for WirelessHD, moving toward having products available for consumers?

Marshall: We're now driving toward developing the compliance test specification. When you announce a specification as being final, if you look at the industry practices, you usually look at a year out before you see products.

You need a large frequency spectrum to move large amounts of data over distances of 30 or more feet. The unlicensed 60GHz band, which is part of the Extremely High Frequency band, offers the bandwidth needed for HD signals. (The EHF band runs in the range from 30 to 300GHz and sometimes is called millimeter wave frequencies, or mmW. In North America, the EHF band is unlicensed from 57 to 64GHz, and this area often is called the 60GHz band.)

Other uses for the 60GHz band include point-to-point wireless LANs and broadband Internet access. However, because signals in this band can be focused, different signals often can be in proximity to each other without interference.

SiBEAM played a large role in the development of WirelessHD, and the specification is based in part on SiBEAM's work before it joined the organization. SiBEAM's founders began academic research of high-speed wireless applications

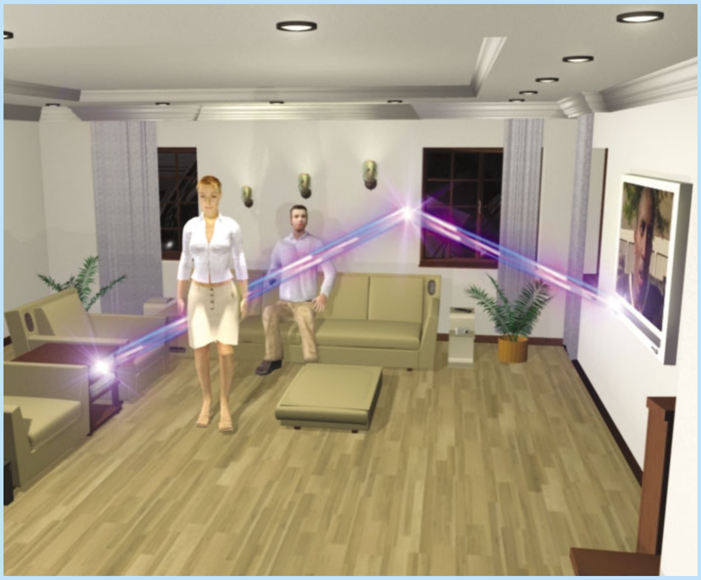
Using Beamforming

The WirelessHD specification makes use of a technique called beamforming that can steer the antenna beam toward the transmitter, and it can focus the receiver antenna toward the incoming beam.

Beamforming, sometimes called beam steering, can increase the sensitivity of the receiver in the direction from which the signal is originating. In a similar manner, beamforming allows the transmitter to generate more power in the direction it's trying to send the signal. As a tradeoff, power and sensitivity in other directions are greatly reduced.

Using the beamforming technique accomplishes two things. First, it optimizes the line-of-sight link, allowing for maximum efficiency. Second, if the line-of-sight link breaks down, the protocol then can adjust and use indirect paths to re-establish a data transfer.

In the illustration, you see how the WirelessHD specification will work when line-of-sight is not available, such as when a person walks in front of the source. The WirelessHD specification allows for use of a smart antenna and beamforming to bounce and reflect the signal off other surfaces, whenever needed. The smart antenna and beamforming also help protect the signal from being pirated by unintended recipients because it's difficult for someone to pirate a directional signal. ▲



Source: WirelessHD.org

at high frequencies in 2001, and they formed the company in December 2004, developing 60GHz in CMOS technologies. SiBEAM joined WirelessHD as a founding member in November 2006.

Secure Content

Included in the WirelessHD specification is a secure content specification, developed by WirelessHD promoter company Intel and called HDCP (high-bandwidth digital content protection). Intel originally developed HDCP for protecting digital content over wired connections, including the HDMI and DVI interfaces.

“If you want to send a movie from the source to the TV, and especially when you’re doing it wirelessly, you need to be sure it’s done securely,” Marshall says. “We met with the studios and the MPAA [Motion Picture Association of America] and reviewed their thoughts. As a result, we’ve included it with the standard. . . . What we’ve found is that the MPAA has been very supportive of our movement in that direction.”

HDCP specifically protects the content during the time that the system transmits it from the source to the receiver, meaning the protection technology will migrate easily into WirelessHD, where the data is in the greatest danger of piracy as it moves through the air to the receiver. Because WirelessHD allows high-quality uncompressed HD video, content providers need to be certain no one or no device can pirate the signal. With HDCP already in use, content providers and equipment manufacturers should have few problems incorporating HDCP or worrying about whether it will be effective with WirelessHD.

“You can see why the industry wants that,” Jones says of HDCP. “The studios wouldn’t feel happy about wireless high def without it.”

Time To Market

Work on the WirelessHD standard began in 2005, and the WirelessHD Consortium officially formed in November 2006. WirelessHD announced finalization of its standard in January 2008. Panasonic and Toshiba both demonstrated WirelessHD products during the January CES in Las Vegas. SiBEAM introduced a WirelessHD chipset in early January, too.

“That was a big statement because it shows the importance of the standard right away,” Marshall says. “It’s encouraging that this technology has come together in this way this fast. We’re really pleased with the progress we’ve made.”

Panasonic debuted an audio/video transmission system that allows for wirelessly sending uncompressed HD video between a display and a piece of A/V equipment, such as a Blu-ray player. Toshiba has created a WirelessHD version of its REGZA LINK functionality, which allows you to use one remote control to manage all devices connected by HDMI cables. Toshiba now will offer REGZA LINK on devices connected by the WirelessHD standard.

The debut of demonstration products is a good sign for WirelessHD’s eventual workability. Ultimately, though, WirelessHD’s success will come only if the companies involved can prove the technologies will work as intended and will be easy to use.

“They have to get the testing right, and the industry does not have a good track record here,” Jones says, referring to some of the problems with HDMI and Bluetooth adoptions.

WirelessHD does have a few potential drawbacks, Jones says.

“It is only an in-room standard,” he says. “It deals with the short-range interconnect problem well, but it’s not a long-range problem solver. . . . It’s more for the home and TV industries, rather than the PC industry.”

Even with a few drawbacks, Jones says the potential that WirelessHD offers is impressive, despite the potential confusion in the market as another wireless standard joins the mix.

“It’s not going to be a universal standard, but that’s not going to be a serious problem, as long as it solves at least one problem extremely well,” Jones says. “The wireless home is going to be fairly chaotic for a few years.” ▲

by Kyle Schurman

WirelessHD Promoter Companies

The WirelessHD organization lists eight companies as promoters and 27 companies as early adopters.

Promoter Companies

Intel
LG Electronics
Matsushita Electric (changing name to Panasonic)
NEC
Samsung Electronics
SiBEAM
Sony
Toshiba

Early Adopters

Agilent
AirGain
ALPS Electronics
ASTRODESIGN
ETRI
Finisar
Genesis Microchip
Himax Technologies
Icron
Inphi
Intellasys
ITI TechMedia
Kolorific
MediaTek
Meridian Audio
Murata
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Synopsys
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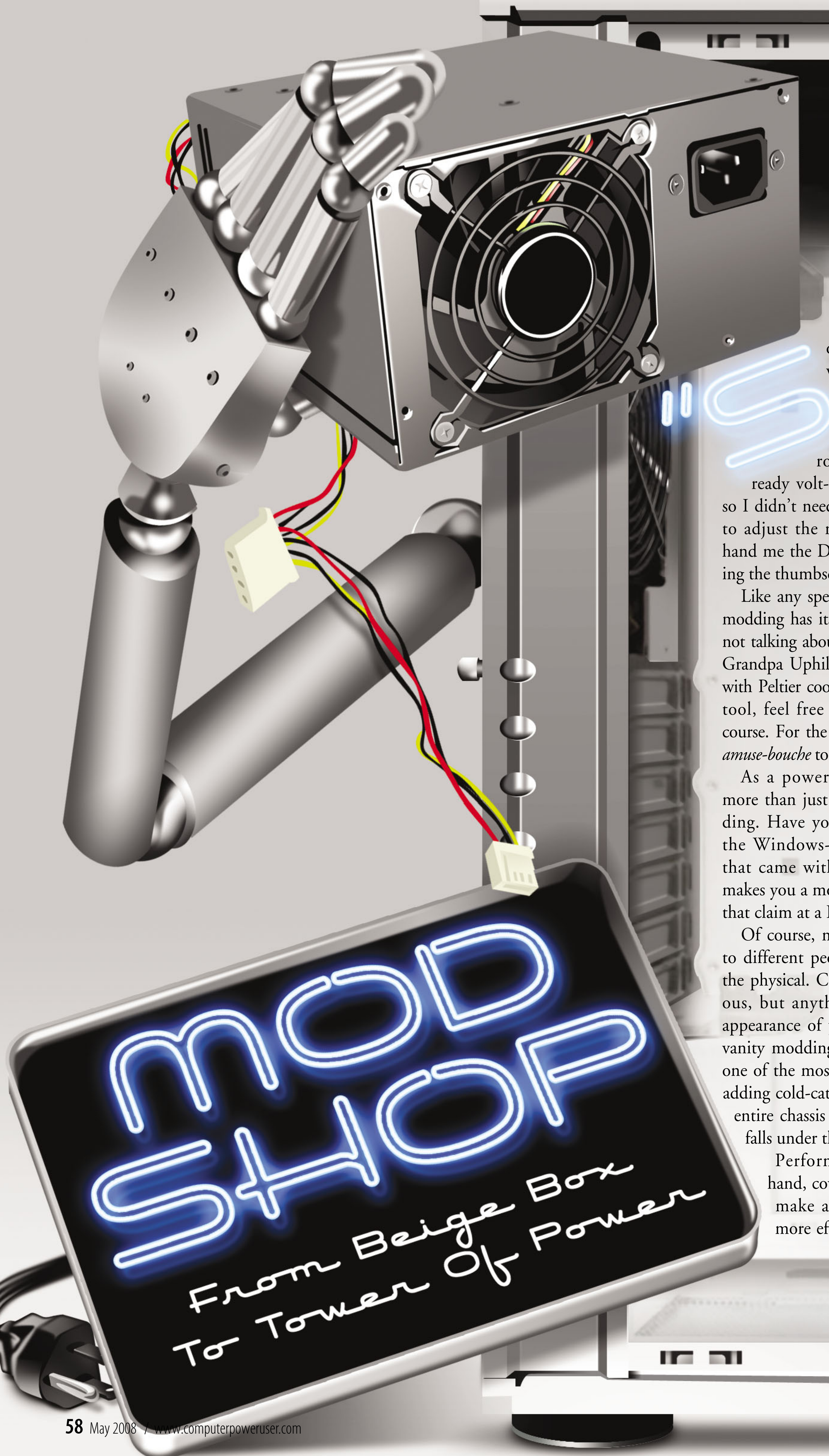
Trans Electric



MOD SHOP

From Beige Box To Tower Of Power

“So, in order to fill my loop with UV-reactive coolant, I had to mount my radiator externally; the black lights took up a little too much room. Thankfully, I had already volt-modded my graphics cards, so I didn’t need to remove any waterblocks to adjust the resistance. Now, could you hand me the Dremel so I can finish polishing the thumbscrews?”

Like any specialized profession or hobby, modding has its own jargon. And no, we’re not talking about terminology that befuddles Grandpa Uphillbothways. If you’re familiar with Peltier cooling and handy with a rotary tool, feel free to skip ahead to the main course. For the rest of you, consider this an *amuse-bouche* to whet your modding appetite.

As a power user, we know you have more than just a passing curiosity in modding. Have you ever played around with the Windows-based overclocking utility that came with your motherboard? That makes you a modder. (Just don’t go making that claim at a LAN party.)

Of course, modding means many things to different people. Vanity mods focus on the physical. Case mods are the most obvious, but anything you do to change the appearance of your system could count as vanity modding. Cutting a case window is one of the most common vanity mods, but adding cold-cathode lighting or building an entire chassis out of Legos (we’ve seen it) falls under the umbrella, too.

Performance mods, on the other hand, cover any types of changes that make a system run faster, cooler, more efficiently, and, sometimes, all three. Overclocking is the most common performance mod, although swapping your graphics card's noisy stock fansink for a massive, third-party, all-copper, passive heatsink counts, too. And of course, there are mods that fall neatly into the A ∩ B area of our modding Venn diagram, such as precise cable routing. Properly routed cables not only look great but help maximize internal air flow for more efficient cooling.

For those of you interested in vanity mods, Dewayne "Americanfreak" Carel of Modders-Inc.com unveils his tricks of the trade on page 60. Carel is no stranger to vanity modding and has years of experience (not to mention a "Mad Reader Mod" appearance of his own on page 38 in the February 2006 issue of *CPU*). These no-nonsense and "Why didn't I think of that?" tips are the building blocks you need to make a sharp-looking system.

The utilitarian clique that prefers performance mods won't be disappointed with the collection of tips HotHardware.com's Marco Chiappetta has assembled. Like Carel, Chiappetta has had plenty of practice: He's pulled off everything from adding a thermal controller (see page 39 in the March 2006 issue of *CPU*) to making a dual-PSU mod (see page 38 in the February 2008 issue of *CPU*). Because so many performance mods can brick your hardware, pay special attention to the guidelines for keeping a forgiving safety net underneath yourself at all times. (And even this isn't guaranteed insurance against a total CPU meltdown.)

If you love powerful PC parts but have always been too timid to tear into your own system, now's your chance. The doors to the ground floor are open, and the elevator goes all the way to the penthouse. ▲

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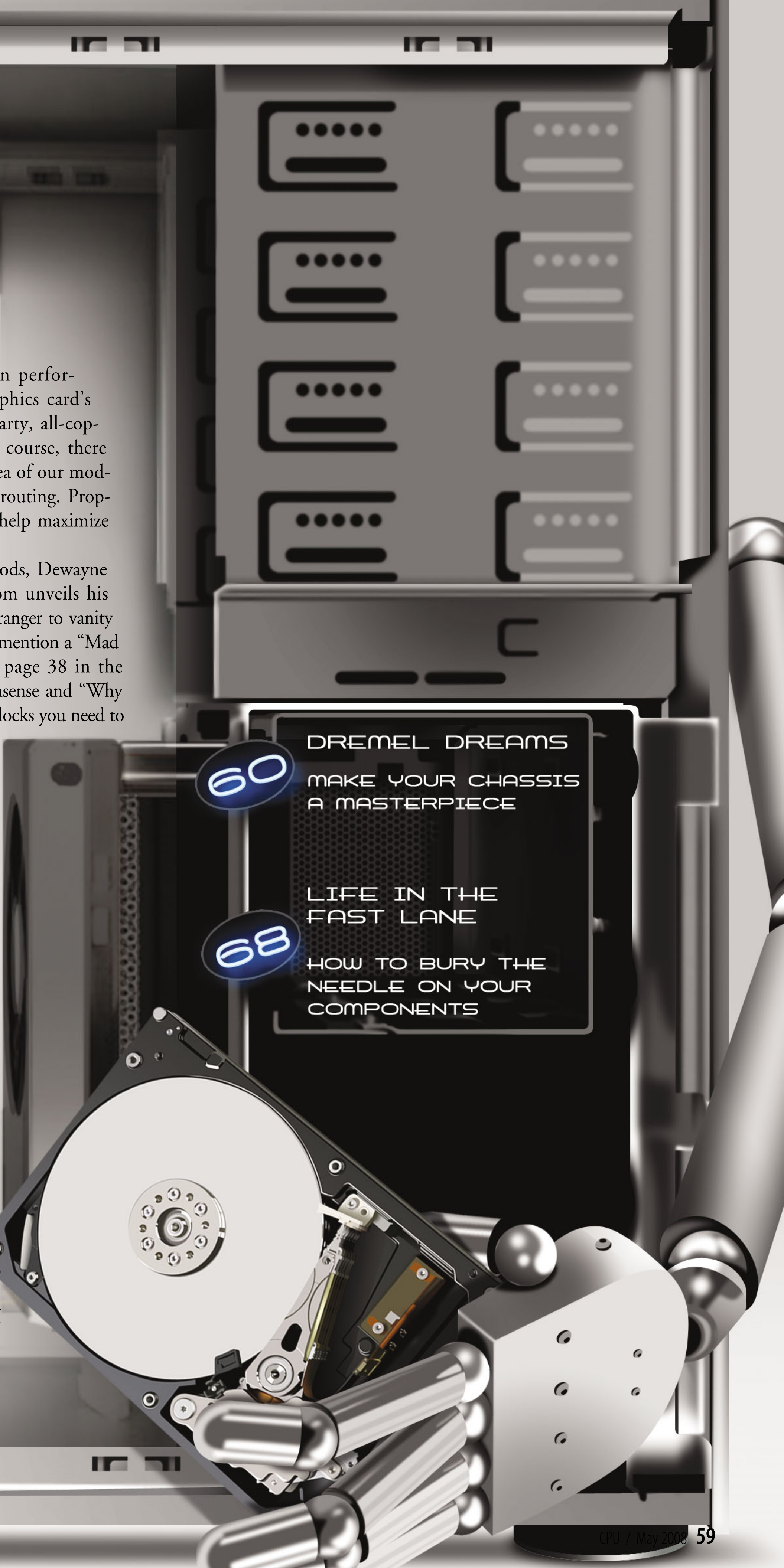
by Vince Cogley



60 DREMEL DREAMS
MAKE YOUR CHASSIS A MASTERPIECE

68 LIFE IN THE FAST LANE
HOW TO BURY THE NEEDLE ON YOUR COMPONENTS

dREMEL dREAMS

MAKE YOUR CHASSIS A MASTERPIECE

You've been bitten by the modding bug and have finished your first modded case. You added a LED-lighted fan, mastered the spray can one-color case change, and maybe added a CCFL (cold-cathode fluorescent lamp). But for whatever reason, it's just not what you wanted (or you think you can do better). You know you want to take your upcoming mod to the next level but are unsure on the correct approach.

Well, you're in luck. We'll be taking a look at a couple key areas and how to achieve the refined look you are striving for.

Creating that masterpiece takes more than just power tools alone. There are many things to take into consideration, such as how much time you really want to dedicate to build. You're not going to construct a killer mod over the weekend (unless you have some fancy "edited-to-fit-in-the-allotted-time-frame" powers we're not aware of). Sure, the tools and materials available to you can determine what you can accomplish, but there is one equalizer: hard work.

Find Your Inspiration

You may be a master with a drill press and other tools, but your mod will go nowhere if you don't have the most important piece of the puzzle: an idea. One of the easiest types of mod to develop ideas for and build is a theme mod. We all have our favorite movie, TV show, game, sport team, etc. Find something that you like about that particular subject and go with it.

Here's an example. A few years ago, *CPU* gave away a modded system at QuakeCon. Before starting the actual mod process, we thought hard about it and began an idea process. Our thoughts started with QuakeCon itself and moved to id Software, then Quake 4. Finally, we had our epiphany: Enemy Territories: Quake Wars. At that time, id Software was set to preview ET: QW at QuakeCon, so only a limited number of screenshots were available. Still, we found the perfect shot of one of the human soldiers wearing a radio pack. The pack was in the basic shape of a computer case, so we ran with it.

Sometimes, as you're scanning through Web sites' featured modded cases, you might see a mod that catches your eye and sparks an idea. There's nothing wrong with borrowing an *idea*: Why do you think modders post their work logs in forums? Doing this helps show how to do a particular technique used on a mod and passes on this helpful knowledge to others. Now, if you blatantly ripped off another modder's mod, that's a different story.

Pick The Perfect Case

It may seem like common sense, but don't mod the case that houses your current hardware. Think about it: Every time you want to work on the case, you would have to tear your system apart and put it back together again. Do this a few times and then see how interested you are in continuing to mod your primary system's case.

If you do want to mod your primary system's case, then go get yourself a $20 case and install your stuff in there temporarily. Or, if you're in the market for a case upgrade, you have the perfect opportunity to mod it before any hardware goes into it. Look for a case that best fits your idea or need. Want it to look like a box? Use an SFF case. Is it going to be a skyscraper mod? Grab yourself a full tower.

During this time, look at all the options that you may need your case to have when you begin building your mod. Now is the time to figure out if the case needs to have a door that covers the drive bays, ports on the top, fan locations, or a precut window.

Tools Of The Trade

Working with the right tools makes the job so much easier. Working with the right *good* tools makes it even better. The last thing you want to do is buy cheap tools. Spending a few extra bucks to invest in quality tools is well worth it, and you'll feel more confident in your work.

When buying a jigsaw, you don't have to spend $200, but don't spend less than $50, either. Look for one that has an option for variable speed control for the blade. This is great when cutting Plexiglas because you need to cut a little slower to avoid overheating the Plexi and having it melt back together. And for some metals, a blade that moves too fast will produce a lot of vibration, giving the cut metal a jagged edge. A jigsaw with a scroll option, known as a sabre saw, is also a good choice. A sabre saw lets you rotate the cutting blade without moving the saw itself. This gives you more freedom with your cuts and can lead to finer details.

Serious modders will want to grab a real scroll saw eventually. Unlike the handheld saws, the blades are stationary; you turn the material to get the desired cuts. There are different types of scroll saws, but we'll focus on the tabletop version. The tabletop type is just like it sounds: You can place it on a workbench when needed and can store it when not in use. Whether you opt for a tabletop unit or go for a freestanding saw, be sure to get one that has a deep throw—at least 18 inches—unless you only plan on cutting smaller pieces. This will allow you to rotate full side panels for precise cuts to almost any piece.

A Fresh Coat

A new paint job is a must-do if you want to create that super mod. The stock paint on a case won't cut it. But before you can get that highly polished, mirrored finish (or even apply the first coat), you have to lay the groundwork. Exceptional preparation is what produces an exceptional final product.

Removing the original paint completely is the best way to begin, and you can do it a few different ways. You could do it by hand with a sanding block and sandpaper, which is fine if you need to build up your arms and have a week or two of nothing to do. Really, we recommend jumping to a power sander that holds either a half sheet or quarter sheet of paper. Doing so will cut down your workload and speed the process.

If you're really serious about removing the original paint, get everything sandblasted (also known as media blasted). Sandblasting is done by forcing silicon sand or other media through a hose and sprayer at a high rate. You can sandblast an entire side panel in a matter of minutes.

Buying a sandblaster is a pricey venture, but finding one is easy. A general-purpose auto body shop might have what you need, but you might want to start with a local hot rod shop, if possible. After all, they do to cars what you're trying to do to your PC's case. If you don't have money to buy the appropriate equipment yourself, paying for a professional paint job is well worth it.

A side benefit of having your case professionally sandblasted at an auto body shop is that, should you choose, you could also commission the paint job, too. If you're unsure about painting your case yourself or would rather dedicate your time to another aspect of the mod, it never hurts to ask if the shop would also paint your case.

But if you're like most dedicated modders, you'll want to paint the case yourself. Automotive paint is among the highest quality. The paint is more

Creating the green battle-worn paint helped bring this mod to life.

An Army Alice Pack Rack made the mod real. (Yes, you can really wear it.)

durable and lasts longer than that of a spray can. In addition to any color you can imagine, automotive paint is available in matte, gloss, metallic, pearl, and color-shifting finishes.

In order to do this, you need an air compressor, hoses, sprayer, tape, a rack, air mask, a place to spray the paint, and good weather. Painting tools are another example of equipment you shouldn't skimp on. If you just want a one-color paint job, then run down to a big-box hardware store and get a general-purpose spray gun and a decent-sized air compressor (2.5 horsepower or higher). Try to spend between $175 and $200. Features you want are adjustable airflow, paint flow, and spray pattern. For doing PC cases, you really only need a smaller gun that holds around 4 ounces of paint, and a gravity-fed gun is the best choice. These guns tend to not splatter when you get towards the end of the paint supply.

When you are ready to paint your case with automotive paint, you need to make sure that you have a few things in order. First, follow the directions and use the recommended thinners and procedures. Different types of finishes or paints may need special steps to achieve the right end results. Next, if you're like most modders, you don't have a spray booth in your backyard. Pick a calm, warm (70 degrees Fahrenheit) day and an open area to paint. Finally, you'll want to find a way to hold your items upright so they're not lying flat. You may need to make a rack or find a place to hang some wires from which to hang the painted parts. This will let you have a bit of carryover spray when you sweep the paint from side to side. You're also less likely to have any runs in the paint or troubles with the spray gun.

The final look of the paint will determine how many coats of paint you want to apply. A single coat of paint for the base color would be fine if you will be applying more colors or designs over the top. If you want a richer and deeper look, you would start by applying one layer of the paint and letting it dry. Then, do some wet sanding with some 1,000-grit sandpaper and water with a touch of dish soap in it. Let that dry for a day and then give it a second coat. Repeat this process until you're satisfied with the look. Be sure to spray on a clear finish to protect your new paint job.

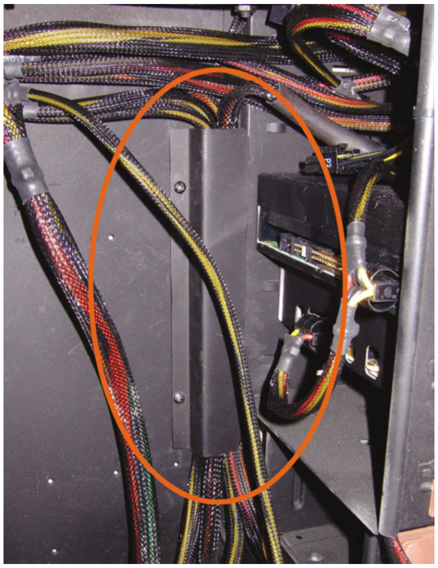
LED lighting lets you show so much more. Lighting effects such as flashes, color change, and fades are possible.

Airbrushing can take your mod to the next level and is quite an art itself. This is not something that you just jump into for your first mod unless it's a skill you can already claim on your résumé. Like anything else, you need good equipment and plenty of time to practice before you touch your case. We recommend a good dual-action brush. This lets you control the paint flow with the touch of a finger.

Iwata (www.iwata-medea.com) has a decent starter kit, model R 4600, that doesn't require an air compressor. Instead, it uses a small can of compressed air. Kits like the R 4600 cost about $150.

When using an airbrush, stencils are your best friend. Using some premade stencils will help you with basic shapes and designs. Graphics, such as skulls and flames, and lettering are common, but if you need something special, you might have to make it yourself. Cruise on down to a craft store near you and you will be able to find a few different items to make them out of. We prefer a semitransparent, blue plastic film for our stencils. You can tape a design under the film and cut out a perfect stencil with an X-Acto blade.

When using a free-form stencil (one that has many different curves) remember that the edges are the most important. Spray across the edge, letting most of the paint hit it, to give you a sharp, clean line on the painted surface. Spray a bit over the top of the edge of the stencil to give the softer/feathered painted edge. Once you get the hang of using an airbrush, you'll be able to paint most of your work without a stencil.



Taking wire management a step further, you could make a cover for the wire to hide behind, like this.

One thing to remember is if there is a buildup of paint, you may need to sand down areas to allow pieces to go back together. You can eliminate this by masking off edges or areas that may have a very close tolerance.

Tale Of The Tape

For painting, automotive tape is the tape of choice. It's made to stay in place and will adjust to the contour of the surface you're working on. Skinny 1/8-inch, which looks like pinstriping, is the ideal tape to use to create flame designs or other free-flowing graphics.

Using one finger to apply pressure, hold the leading length of tape taut as you twist and turn it to create your design. Once you have your design laid out, you will need to go back and cover the areas that you do not want painted with a wider tape. Allow the wider tape to overlap the narrow tape a bit.

Blue painter's tape is another good option. This tape has become more popular, due to its great coverage and easy release tacky glue. For us, painter's tape has become indispensable to modding. You can use it to mask off parts being prepared for painting and protect surfaces from getting scratched while you test-fit parts or reassemble the case. Painter's tape costs more than your normal masking tape, but it can save a lot of unnecessary grief when removing it after applying your paint.

Transfer tape is normally used to apply vinyl die-cut stickers to different surfaces. The reason this is also another great tape to use is that the glue used on this tape is just tacky enough to hold on to the vinyl when you are removing it from the slick wax-paper backing. With the tape having a less tacky grip, it is ideal to apply to the surface of dry paint, as it will not damage the work. (There's nothing worse than using a tackier tape and pulling up part of the graphic.) You can find a variety of sizes to cover and protect work you have already finished.

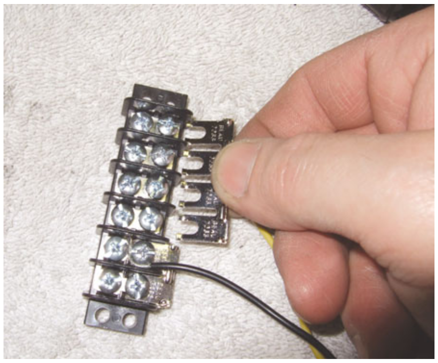
Finally, don't fall victim to the cheap price of masking tape. The glue used on masking tape is too tacky and can leave a film behind if left on for a while.

Your Rig In Lights

When you are watching a movie, you know that the lighting creates the tone and mood of the scene. Imagine a scary movie set to bright colorful lights. It would kill the mood completely.

This same principle applies to the lighting effects for your mod. Think about it: A mod that has flames or a fire theme should use red, amber, or yellow lighting. Blue or green color wouldn't have the correct effect.

A fine example of how lighting can help create the right "mood" is Sheldon "Sheldog23" Bright's MKTB mod. (See page 36 in the October 2005 issue of *CPU*.) By starting with a store-bought Plexiglas case and adding semitransparent vinyl graphics and backlighting, he was able to highlight the right areas and give the case a great effect that made you look at it.



In just a few minutes, you can create a power strip for lighting with a terminal block and jumper strip. The final result looks clean and professional.

But back in the day when modding was starting to go mainstream, a simple yet effective way to light up the inside of your case was by using a CCFL. Despite the name, a CCFL can add unwanted heat to the inside of a case. Cold-cathode devices also use a high-voltage/low-ampere power supply that emits heat and at times puts off a very high-frequency, audible noise; plus, its power supply box has to be hidden somehow.

CCFL lighting eventually gave way to LEDs. LEDs are nothing new but are now the preferred lighting method for a modded PC. LEDs consume less power and produce less heat. You can make a unique lighting array by using different color combinations and effects such as fading or flickering in a pattern. The customization possibilities are just about endless.

A great example of LED lighting is a mod by Tony "Tazz" Day. Tony took a prototype chassis and built his mod from scratch. But what really makes this mod stand out is a custom LED setup from DragonModz (www.dragonmodz.net) that can change colors, flash or fade the lights, and is controllable by a wireless remote. You can see the full light show at tinyurl.com/2dkayp.

One final note: Don't overdo the lighting of your case unless it's a part of the mod's theme, such as a radioactive container that has a green, glowing haze around it.

The Art Of Wire

The one thing that we can't stress enough is meticulous wire/cable management. There's little that bothers us more than seeing a modded case with a great-looking exterior have a rat's nest of wire on the inside. Why waste all your time and effort trying to create the perfect mod and then stop because you don't think anyone will see the inside?

Look at how the wire is currently done in the case and note anything that may need to stay that way or that could be done better. Only use what is needed. Do you really need that FireWire cable hooked up?

Grouping wires that go in the same direction is a perfect way of removing the clutter. Wires associated with the case's power and reset switches, such as power, reset, USB, and indicator LEDs, all connect to the same place on the motherboard—the lower-right corner. By using small plastic tie wraps, you can group them together and tuck them out of the way.

The best way to make the inside of the case look clean is to minimize the amount of visible wires . By hiding the wires and cables, you can obtain this look. Most of the time, the left side panel shows off the inside of the case. This gives you plenty of places to route and hide your wiring—behind the CD/hard drive cages and the motherboard tray. And don't be afraid to drill a hole or two in areas of the case that would simplify the routing process.

Adding dual LCDs and cleanly organizing the wires gives the "Lucid Dream" a winning look.

That, along with some plastic wire wraps to bunch up and secure any excess wires, will help hide the wires.

To take this to the next level, you would capture all the wires in one sleeve cover, making it appear as one cable. For extra polish, use colored tie wraps that match with the sleeve color.

Use correct cable lengths when you can. Don't use a 1.5-foot SATA cable to connect your hard drive to the motherboard when an 8-inch cable will work. (On the other hand, you could use a longer SATA cable if your optical drive uses a SATA cable.) Cables that are the particular length you need may cost a little more, but the difference in appearance is worth it.

When you add effects lighting, LED fans, and similar items, most of these items come with a Molex connector attached to them. One or two of these devices aren't a problem, but when they start adding up, you should really make a power bar. At a Radio Shack or electronics store, you need to pick a dual-row barrier strip and jumper strip. The barrier strip lets you terminate one or more wires together without actually bonding them together as one. The jumper strip can turn a couple of terminals into a single connection point. This gives you the flexibility to connect multiple devices to a single power source.

Power supplies are the biggest headaches for modders. Where do you hide the cables that you don't need? You could go to the extreme and remove any unwanted wires, but that means you just gave up the ability to expand in the future. That's why modders made the first modular power supplies. Whenever possible, use a modular PSU so you can choose the perfect number of cables for your system.

Don't be afraid to cut wires; sometimes you have to. Why leave a wire 12 inches long when it only needs to be 4 inches or vise versa? Likewise, don't be afraid to reconnect cut wires. A quick and easy way is to buy a kit that includes solderless terminals and a crimper. Such kits typically cost around $20. The downside to this method is that you have a colored, plastic-coated piece that stands out. Slip wire sleeving over it and forget about it.

A second way to reconnect a cut and shortened wire is to solder the wires back together and use heat shrink tubing to cover the bare wire. Neither of these methods requires you to remove the end of the wire (for example, a Molex connector).

A Display Of Talent

Virtually everyone is familiar with the handful of TV shows where a custom hot rod shop installs a few dozen LCDs in a lucky person's car. You can do the same thing with your PC, and it's actually pretty simple. These smaller LCDs that go into your car use DC voltage, which just so happens to be the same voltage your PC uses. The tiny LCDs are the perfect size to install into any available space on your PC.

At around $100 to $150, they are a bit expensive, but making your perfect mod is rarely cheap. Thankfully, if you get the correct one and have all the right accessories, you can have it working within 15 minutes.

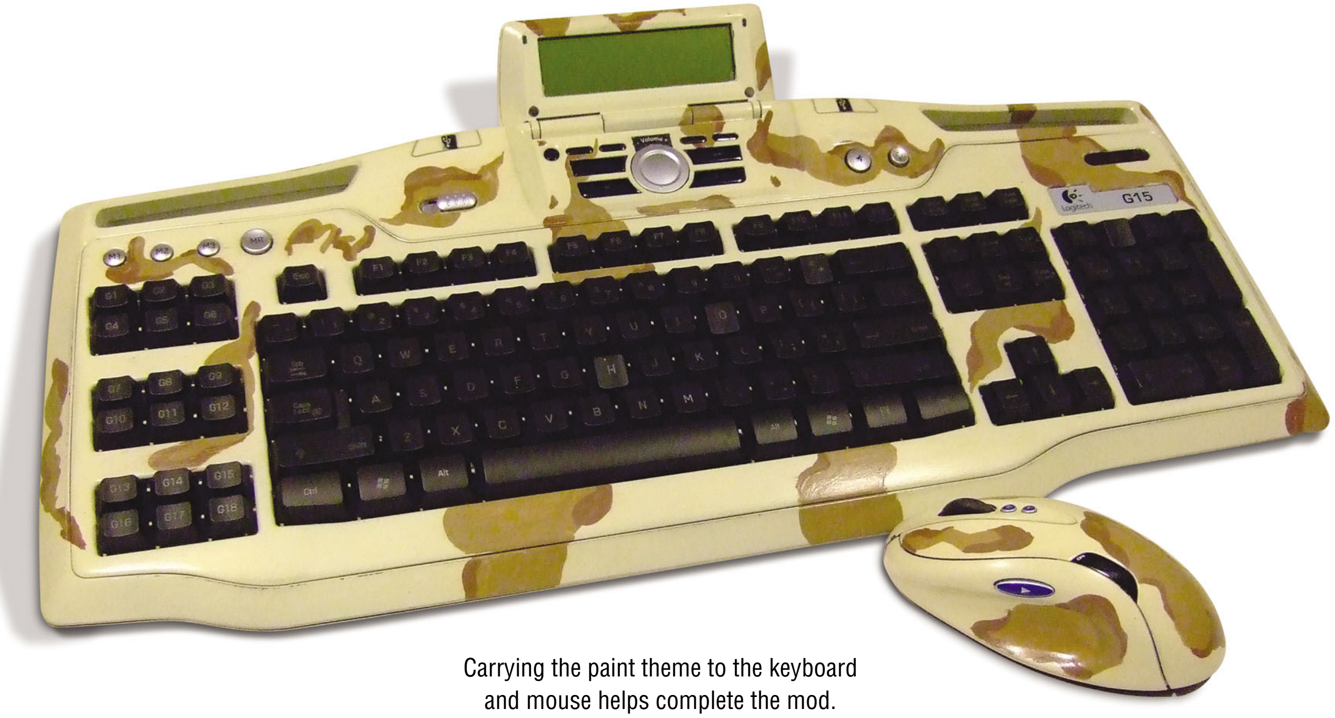
The hardest part is connecting these LCDs to the graphics card. If your video card has an S-Video or composite output, you're in luck. Next, you need a composite video cable that is a couple of feet long. This will give you enough length to route and hide the cable. If your graphics card has an S-Video output, just pick up an adapter. And as an added bonus, some of the screens already come with the connectors and wires attached. These are the ones you are looking for, as it makes things so much easier to work with.

If you don't want to invest in an LCD like the one described above, serial or USB LCD modules from companies such as Crystalfontz (www.crystalfontz.com) or Matrix Orbital (www.matrixorbital.com) are other options. These aren't TV screens; rather, LCD modules display a single color over another background color. Both of these companies offer complete kits that will let you install the hardware into a drive bay, plug the cables into either a USB or serial port, and install the necessary drivers and software.

The next step up from the "character" LCD is the graphical LCD. These are the LCDs you commonly see in the top-end in-dash car audio players. You won't be able to watch TV, view your desktop, or view other graphical content with a graphical LCD, but you will be able to show information from apps such as Winamp, Zoom Player, RSS readers, and email clients. These LCDs rely on plug-ins made by the software creator or by members of their respective communities. This means that there is just about an endless supply of plug-ins to add new features to your LCD.

PSU Mods

One of the necessary evils for any modder is the power supply. You have to have one, but the wire and cable must be tucked away. As we've mentioned, the lack of a big ball of cluttered wires is key to a professional-looking mod.



Carrying the paint theme to the keyboard and mouse helps complete the mod.

Before modular PSUs, who came to the rescue? Why, a modder, of course. Modders were the first to remove any extra wires protruding out of the power supply, but this method obviously removes the option of future expandability. So, once again, a modder came up with the idea of cutting the wires and using Molex connectors to make the first modular power supply. This mod became so popular that power supply manufacturers started to make them.

Finding the right color power supply unit to go exactly with your mod's theme can sometimes be a real pain, but you can carefully take apart the power supply to paint it like you would any other part of the case. If you have to open up the power supply, be sure to be very careful around the capacitors, as they do hold a charge for a length of time. It's not going to kill you if you happen to discharge one of the capacitors, but you will have to change your underwear.

A quick and easy way to improve the look of your power supply is to remove all the stickers. To easily remove any stickers, you can use a heat gun or WD-40. Some of the better manufacturers have learned a lesson from modders and have begun to place the required stickers on sides of the PSU that aren't normally visible.

Most power supplies nowadays come with the power cables already sleeved, usually in black. Black is a good, neutral color but doesn't always complement the design you're trying to pull off. Don't hesitate to change the color of the sleeving. There are many different-colored PSU modding kits for under $20. These kits give you enough sleeving to cover not only the power supply wires but also the rest of your PC's wires.

Soap and water helps you apply the vinyl and move it into the correct position.

Going All The Way

So, your mod is looking as sweet as ever, but the keyboard and mouse are still bone stock. This won't do. You have to complete the whole effect by continuing the theme to these peripherals. Although these peripherals are mostly made from plastic and can be a pain to paint, you can still get a good result with the automotive paint.

The trick, as usual, is all in the prep work. Once you disassemble the mouse and keyboard, give the plastic a light sanding with some 220-grit sandpaper. But be careful: Sanding too hard will introduce unwanted grooves in the surface. Next, start working your way through finer grits of sandpaper—400, 600, and 800. This will preserve the plastic's smooth-surface back but open the material up to bond better with a primer application. After going through the proper steps of sanding the primer and applying the paint, make sure that you lay down a few clear protective coats. Without doing this, your paint job will be exposed to a lot of wear and tear and will not last very long.

A MODDER'S MOST VALUABLE VENDORS

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McMaster has about any and everything you can dream of in the way of screws, nuts and bolts, metals, tools, etc. The last time we ordered from them, our order arrived on our doorstep before they even charged our account.

www.mcmaster.com

Directron

This is a great site to find just about any little extra you might need, such as nonstandard length motherboard standoffs and other odds and ends.

www.directron.com

HyperKore

The place to go for getting a custom image laser-etched into any size window. HyperKore has plenty of premade windows to choose from.

www.hyperkore.com/etchings

Laptop Design USA

Laptop Design USA offers two ways to help you create your custom PC or laptop. The first process applies automotive paint to the selected surfaces of a laptop, PC, or component(s). The other application is a patented process that imbeds the colors and image you select directly into the surface of the system.

laptopdesignusa.com

Allelectronics

The name says it all about this one-stop shop. With an enormous supply of electronic and electromechanical parts and supplies at marked-down prices, it's easy to find what you need (and then some).

www.allelectronics.com

Kustom Shop

There's no better place to find a custom paint for your mod than Kustom Shop. You can find plenty of painting accessories, such as tape and stencils, here, too.

www.tcpglobal.com/kustomshop

Iwata Medea

Iwata makes a top-quality product, and most of the best airbrush artists use them. The equipment is pricey, but if you want the best, you'll pay for it.

www.iwata-medea.com

Paasche Airbrush Company

Like Iwata, Paasche is another great airbrush maker that has been around for a long time. You can't go wrong if you pick one of these up.

www.paascheairbrush.com

Delvie's Plastics

Delvie's has a wide selection of Plexiglas and very competitive prices to match. A 24 x 24 x 0.25 inch (HxWxD) sheet sells for $24—that's a steal!

www.delviesplastics.com

Fluke

Fluke, which sells hosts of tools, offers outstanding multimeters, including our personal favorite, the Fluke 12. It can switch to AC voltage, DC voltage, or resistance measurements automatically, depending on the input.

us.fluke.com

Mnpctech

Real modding parts made by a real modder. Bill is one of the best case modders on the scene, and he makes some outstanding parts out of billet aluminum. The prices are very affordable.

www.mnpctech.com

There are some surfaces that are extremely difficult to mod to your liking. In these situations, use printed vinyl. For example, let's say you want your power supply to look like it has been made of carbon fiber. A quick Internet search yields a number of vendors that sell carbon fiber printed vinyl.

Before applying printed vinyl to a power supply, remove anything that may get in the way, such as decals, fan guards, and screws. Creating a template before you start is also a good idea. Take a large piece of construction paper or tape together a few pieces of notebook paper to get the size you may need. Then, trace each side of the PSU so that when you cut the shape out, you could fold it around the PSU. It's a lot like cutting out wrapping paper for a package.

We like to add about a 1/16- to 1/8-inch to the outside edges to have a little extra for overlap. Allowing the edges to overlap lets you go back and do a double cut. This is a trick from wallpapering around a corner. Cut through both layers, remove the excess material, and lay the two edges back together for a perfect fit.

Applying a large vinyl section can be a little tricky. Make sure that the surface is clean and free of any debris. Next, take a small amount of water with just a drop or two of dish soap in it and spray it onto the surface. This lets you move the sheet around without having it stick to the surface right away. Once you get the vinyl in the correct position, take a plastic squeegee and start pushing the water out from underneath the vinyl towards the edges. Continue to do this until all the bubbles are gone.

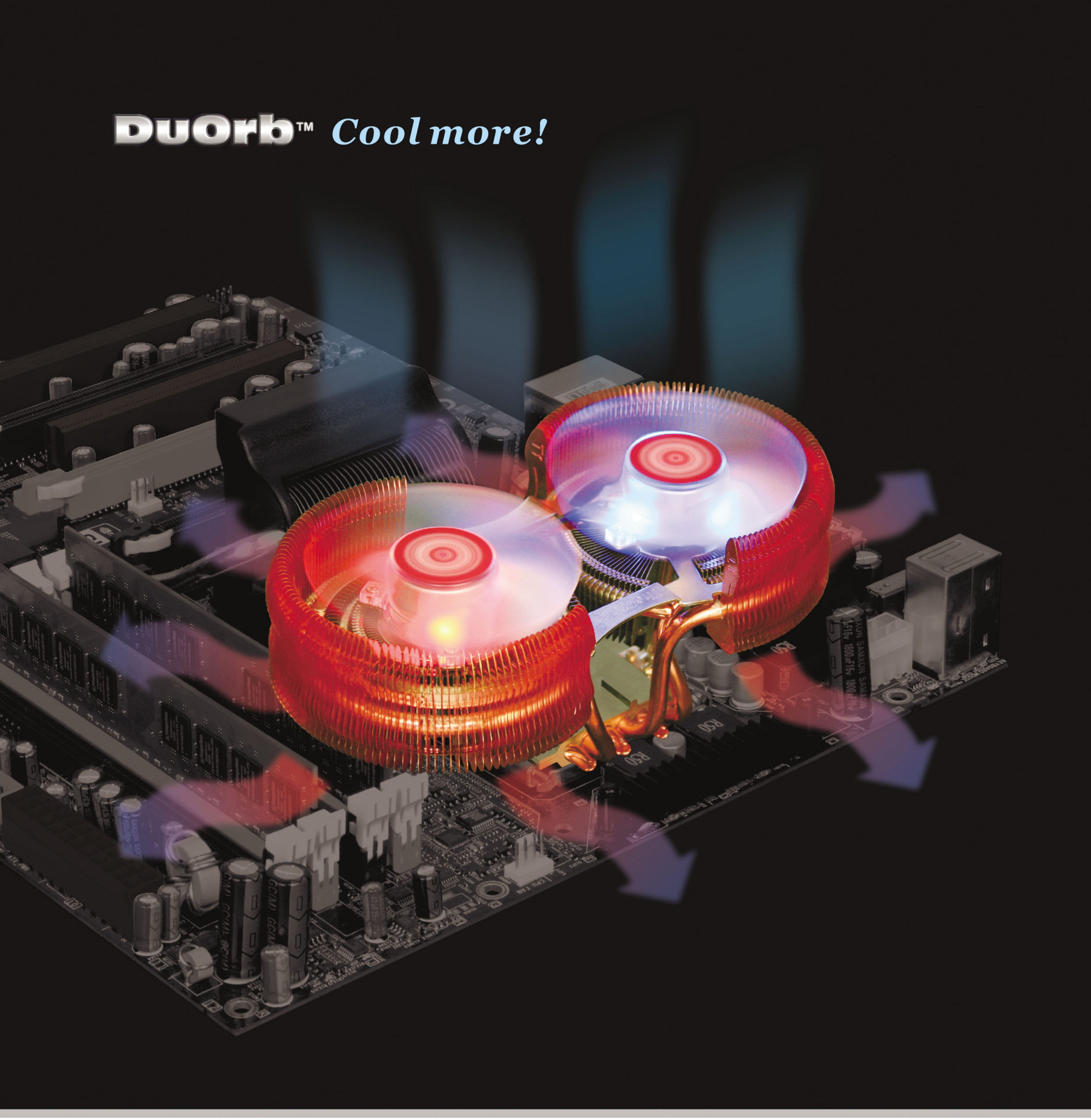
Don't be worried if there are a few little bumps that you can't get out. These will disappear over time as the water evaporates and can be rubbed over to make them disappear. If you have one or two that won't go away, take a needle and pop a tiny hole in it. This will release any air that was left behind, and you can now smooth out the bump.

Finishing Touches

The most important tip that we can give you is this: Have patience. If you follow through and don't rush yourself, you will end up with a successful build.

As for the rest of our tips, as you learn to flawlessly execute them, you'll discover more tricks and techniques of your own that will further enhance your mods. Who knows? Maybe your rig will grace the pages of our "Mad Reader Mod" sooner than you think. ▲

by Dewayne Carel



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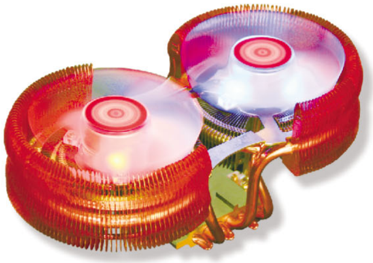

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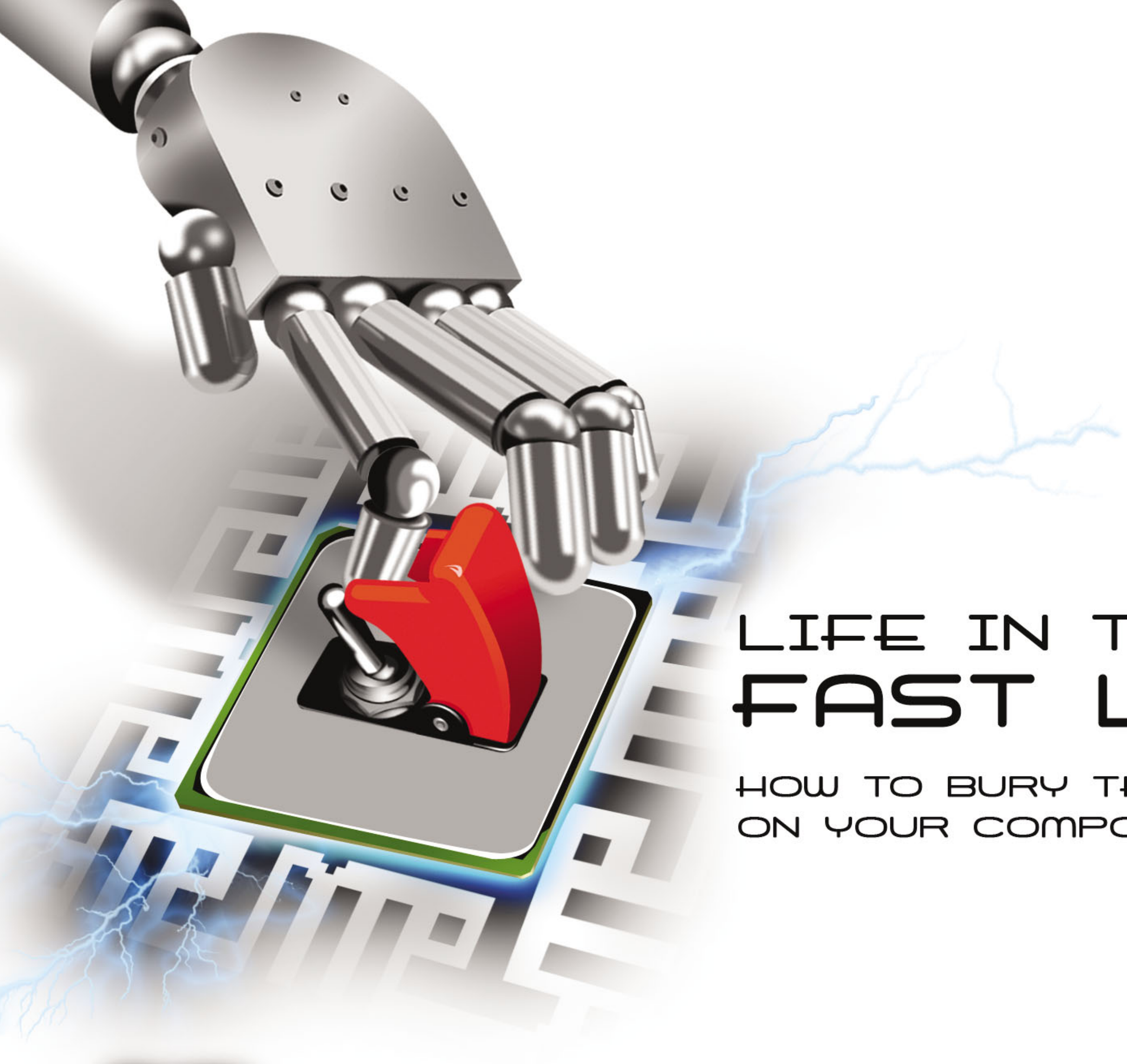


LIFE IN THE FAST LANE

HOW TO BURY THE NEEDLE ON YOUR COMPONENTS

The term "modding" has come to encompass a myriad of PC-related activities over the course of the last few years. In the early days, cutting a hole in the top of a case and mounting an additional exhaust fan was considered innovative. But now, modding entails everything from overclocking to creative cable management. The more elite modders out there have even graduated to designing and fabricating their own custom enclosures, fan controllers, cooling apparatus, and other parts.

But every advance in modding comes with new challenges and pitfalls. One thing all mods have in common is that they'll almost always void at least one warranty. This makes taking the right precautions and properly completing a mod on the first try all the more important. To aid you in your PC modding efforts, we've decided to put together a list of tips and tricks to give you all some insight into ways to avoid a few of the more common mistakes and pitfalls that can occur when performance-modding a PC.

We've broken up our list of tips into the following categories: overclocking, cooling, upgrading, and cable management. In each category, we'll outline a number of potential mistakes and explain how to avoid them and explain how to prevent problems from arising. Hopefully, by the time we're done, we'll have armed you with the information necessary to safeguard your newly modded PC and its components from possible failures.

Overclocking Overtures

We all know overclocking is a great way to wring more performance from a PC. But there are right and wrong ways to do it. When overclocking a CPU for example, don't shoot for the stars right out of the gate. Assuming you're overclocking by altering the FSB (or HyperTransport) frequency, start out by increasing the FSB by only 5 to 10MHz at a time. When you hit a specific milestone—say every 200MHz increase in the CPU clock—test the system for stability using an application like SuperPI or 3DMark06. If the system is stable for an extended period of time, resume increasing the FSB frequency and repeat the process until you find your processor's maximum stable frequency.

Some modders like to start with an ultra-high FSB and back down until their system boots. We discourage this practice because it puts undue strain on the hardware and increases the risk of damage. Starting out with higher-than-optimal FSB speeds will also increase chipset temperatures needlessly.

The same principles outlined above also hold true for video card overclocking, with the additional caveat that GPU and video memory frequencies should be increased independent of each other. Increase the clock speed of one component first, and once you find its peak, move to the other.

If you tweak both the memory and GPU frequencies at the same time, it's impossible to determine which has hit its peak in the event of an error.

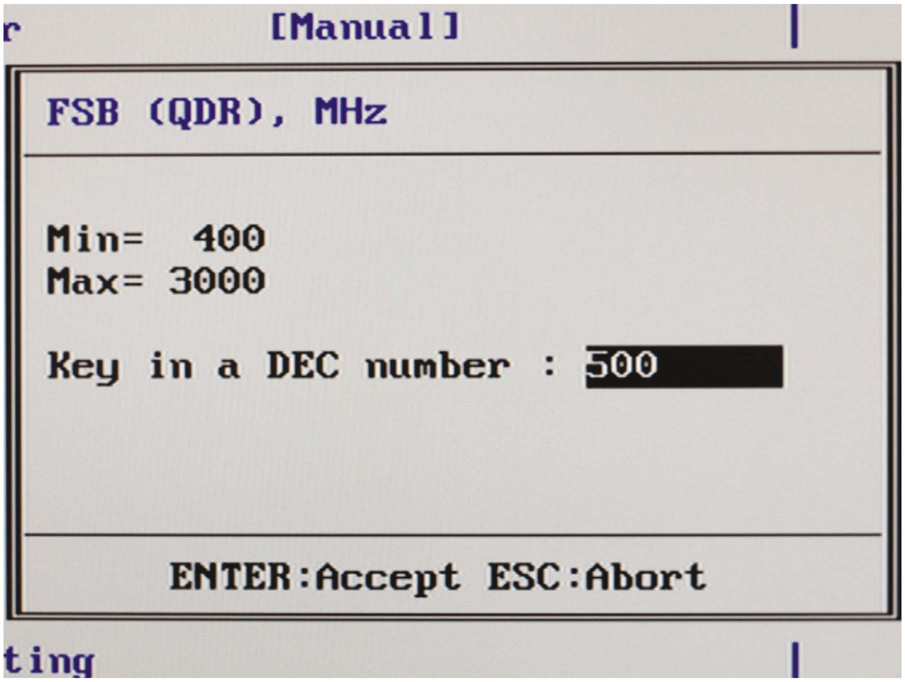
If there is one hard-and-fast rule to overclocking, it's that your mileage will vary. Just because one particular CPU is capable of hitting a certain clock speed doesn't mean yours will. Take Intel's Core 2 Duo E6750, for example. There are numerous reports of the 2.66GHz E6750 hitting clock speeds approaching 4GHz with traditional air cooling. But that doesn't mean all E6750s can hit that speed. Each CPU (or video card, or memory module, etc.) is different and requires individual effort to overclock.

The message is this: Don't rely on third-party overclocks to determine your ultimate goal. Yes, it's important to do research to see if a particular CPU or GPU is capable of hitting a certain speed, but don't overclock your chip under the assumption that it will hit the same speed as the next guy.

It's very common for overclockers to increase voltages to components such as processors, video cards, or memory. Typically, increasing the voltage to a component will allow it to run at higher speeds. But like anything related to overclocking, there are limits. In fact, there are times when increasing the voltage to a component can hinder its ability to hit higher frequencies because the excess voltage results in higher temperatures and more strain on the device. We should also point out that setting a voltage too high is one of the quickest ways to destroy a component.

Let's use the same Core 2 Duo E6750 we mentioned earlier. If the E6750 overclocks to 3.8GHz with a 1.5V core voltage but runs at an excessively high temperature, it will throttle back down to maintain stability. The higher core voltage and resulting high temperature will hinder overall performance and reduce the chip's lifespan. If this happens to you, try backing the voltage down a little bit at a time to find the sweet spot. If that means sacrificing a few MHz, so be it. It's better to have a CPU that runs at full speed all the time than to have one that throttles under load.

Speaking of excess heat, to ensure that a system is running within acceptable thermal limits, you must constantly monitor the temperatures of vital components. Many motherboards have integrated sensors for monitoring chipset and VRM temperatures, and virtually all GPUs and CPUs have built-in thermal probes. Use the PC health data that these sensors provide to monitor a



```
r                   [Manual]

 FSB (QDR), MHz

 Min=  400
 Max= 3000

 Key in a DEC number : 500

        ENTER:Accept ESC:Abort
ting
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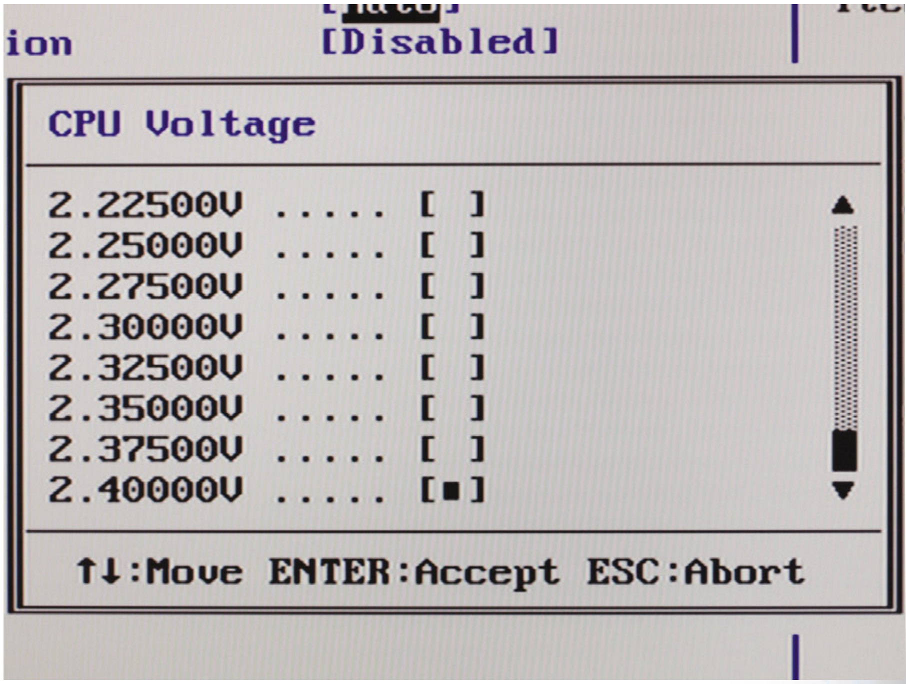
Overzealous overclockers have a tendency to ratchet up clock speeds too quickly. Take your time when overclocking, and increase your CPU's or GPU's frequency only a few MHz at a time until you hit its upper limit.



```
ion                  [Disabled]

 CPU Voltage

 2.22500V ..... [ ]
 2.25000V ..... [ ]
 2.27500V ..... [ ]
 2.30000V ..... [ ]
 2.32500V ..... [ ]
 2.35000V ..... [ ]
 2.37500V ..... [ ]
 2.40000V ..... [■]

  ↑↓:Move ENTER:Accept ESC:Abort
```

Many modders incorrectly assume more voltage equates to higher clock speeds. In fact, higher voltages can sometimes hinder overclocking efforts and significantly increase temperatures.

system's temperatures and react if a component is running too hot.

Power users have an insatiable desire for high performance, so it can be hard to run a component at a lower frequency when it's capable of more. But the most stable long-term overclocks aren't those that run on the bleeding edge. If a particular CPU is capable of running at 3.8GHz with 1.5V but would be under much less stress at 3.7GHz/1.4V, we recommend sacrificing the relatively small increase in clock speed. If that extra 100MHz and .1V puts much more strain on the CPU, then the miniscule increase in performance isn't worth the associated risks. If you find yourself in a similar situation, back off a bit. Although your benchmark scores may be a little lower, your system will be more stable, run cooler, and have a longer lifespan.

Cool Under Pressure

We've discussed lapping and polishing heatsinks and integrated heat spreaders many times in the pages of *CPU*. Lapping and polishing is a relatively simple, although time consuming, way to ensure a component and its heatsink are mating properly, which can shave a few degrees off of the operating temperature. However, improperly lapping and polishing a component can do irreparable harm.

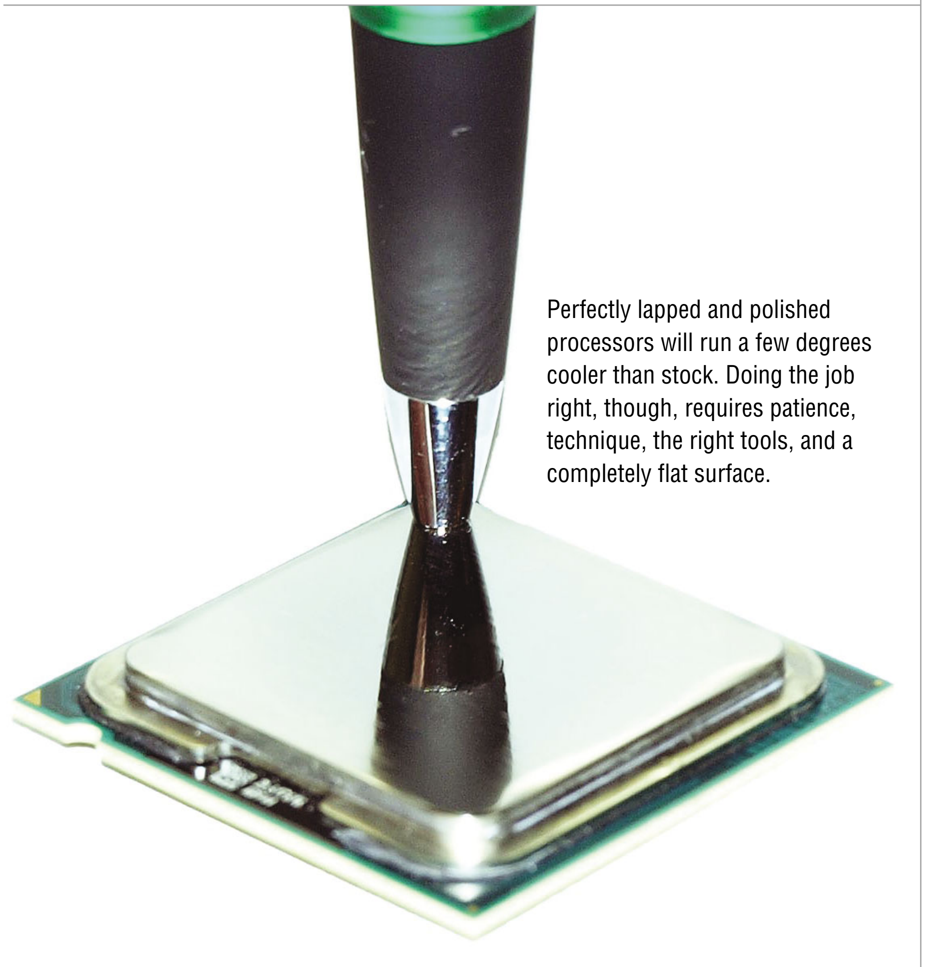
To lap and polish a heatsink's base or a processor's integrated heat spreader, you must use the proper tools and work in the right environment. You'll need an assortment of 600- to 1,500-grit wet/dry sandpaper, a flat surface (a sheet of glass works well), some water, dish soap, a wadding metal polish, and lots of patience.

Your instinct may be to hold the sandpaper and run it over the heatsink (or CPU's heat spreader) to remove imperfections, but that's the wrong way to go about it. You'll ultimately end up with an uneven surface. Instead, lay the sandpaper flat and wet it with some soapy warm water. Then work the heatsink back and forth over the paper, using very little pressure, while also making sure the heatsink is perfectly flat. Start with the lower grit sand paper and rotate the heatsink 90 degrees every few strokes until you've make a complete rotation. Take your time and don't remove too much material. Progressively work your way up to the highest grit paper, and then buff the heatsink's surface with a wadding metal polish to get a mirror finish.

For any heatsink to function properly, it must make good contact with the component it's meant to cool. Some sort of thermal interface material, such as thermal paste, is required to fill in tiny surface imperfections and help the two surfaces mate. For optimal thermal transfer, however, you must apply the thermal paste properly. Too much or too little thermal paste prevents the heatsink from absorbing heat, which will result in higher temperatures.

First, we always recommend using a high-quality thermal paste from a well-known brand. When applying it, use the smallest amount possible, but use enough to completely cover the surface the heatsink is making contact with. If a lot of thermal paste oozes out from the sides when the heatsink is installed, you've used too much. But if you can see the surface through the paste, you've used too little. A paper-thin, perfectly smooth application is best.

Using the wrong thermal paste can be just as detrimental as not using enough. There are a number of different types of thermal paste on the market. Some have a ceramic base, others use hard or liquid metals, while others have a carbon base consisting of diamond powder. Not only do these different types of thermal pastes perform differently due to varying degrees of thermal conductivity, but they also have varying degrees of electrical conductivity. A silver-based thermal paste is electrically conductive, but a ceramic-based paste is not. This is an important fact to keep in mind, because using an electrically conductive thermal paste in the wrong situation can cause severe damage.



Perfectly lapped and polished processors will run a few degrees cooler than stock. Doing the job right, though, requires patience, technique, the right tools, and a completely flat surface.

Virtually all of today's desktop and server processors feature integrated heat spreaders, which cover the CPU die and maybe a few surface-mounted components on the processor's packaging beneath, so any thermal paste is safe to use. Most of today's GPUs, however, have their dies exposed, along with some traces, pads, and surface-mounted components. If an electrically conductive thermal paste is used on a GPU and it oozes or seeps onto exposed electrical contacts, it will cause a short circuit, potentially damaging the chip. For situations like this, we recommend using non-electrically conductive thermal paste.

Air cooling, using a number of strategically placed fans, is still the dominant method used to cool a PC's internal components. But there's more to air cooling than just adding fans. A system with a dozen fans, for example, could have inferior cooling performance in comparison to another with just two fans if the former's aren't configured properly.

For air cooling to work best, your fans must draw in roughly as much air as they exhaust. And the temperature of the air being sucked into the system should ideally be lower than what's being exhausted. When adding (or removing) fans, always check their CFM rating. This number will tell you how many cubic feet of air per minute the fan can move. If your exhaust fans are expelling 150cfm of air, try to set up your intake fans to draw in that amount. (And remember to factor in the fan, or fans, of your power supply.)

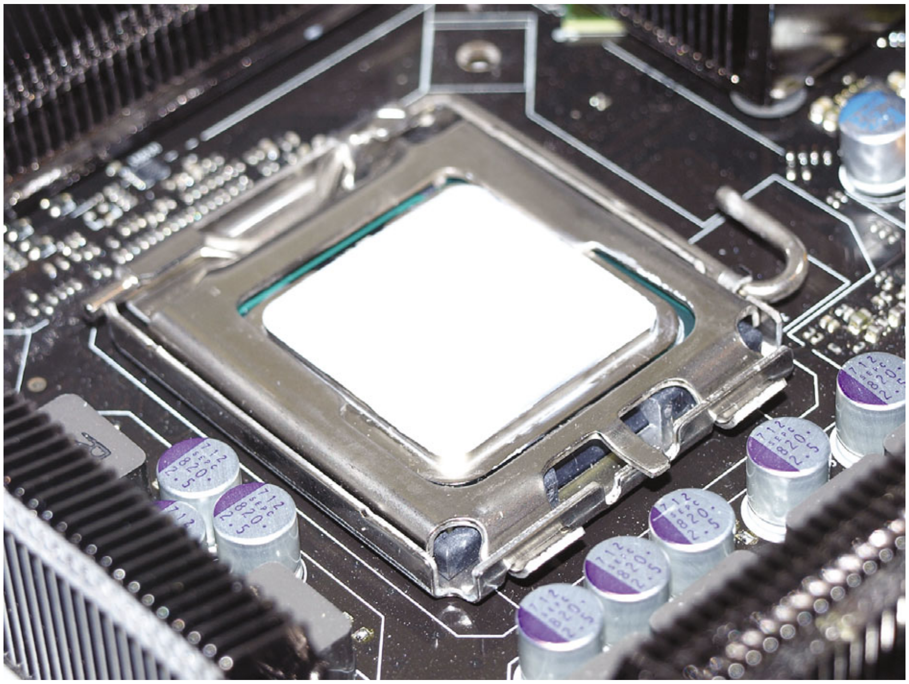
In addition to a fan's CFM rating, you should also take into consideration its position and direction. It's best to have intake fans in lower positions and exhaust fans in higher positions, because the intake fans will draw in cool air from the floor and the exhaust fans will expel warm air that rises through the inside of the case.

The Dos & Don'ts Of Upgrading

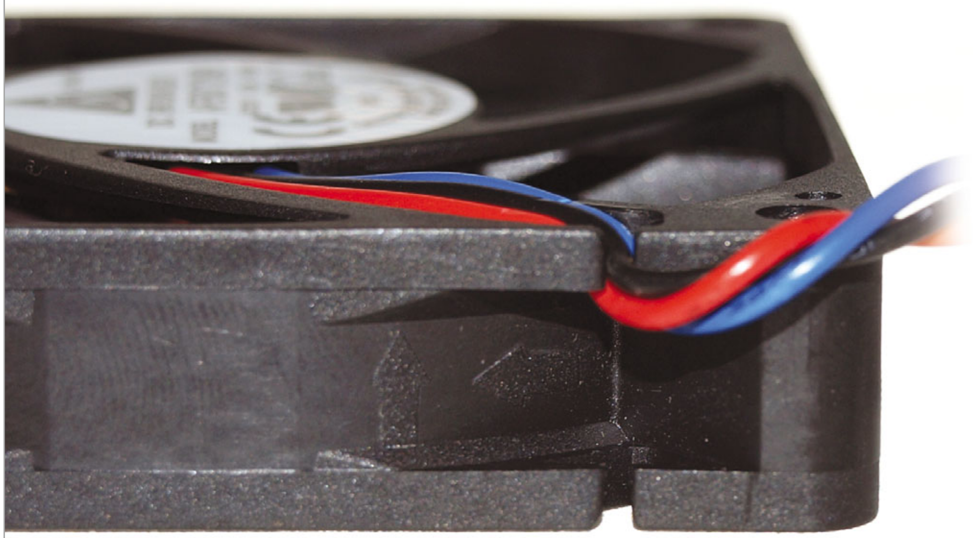
Few things are more heartbreaking than damaging a component during an upgrade. But the fact remains that there are a limitless number of ways to break something when working in the tight confines of a PC. We're all bound to damage something sooner or later.

To minimize the risk of damaging a component during an upgrade, you must be aware its surroundings. We're ashamed to admit that on more than one occasion, we've ripped a surface-mounted component off the back of a video card while inserting it into a slot. You see, the clips used to secure the RAM in its DIMM slots were extended and just barely touching the backside of the video card. When we pushed the card into the slot, the clip wedged itself under a resistor on the graphics card and broke it off.

Of course, RAM retention clips aren't the only thing you have to look out for. Occasionally, an expansion card will



Applying too much or too little thermal paste will hinder cooling performance; a paper-thin, smooth layer across the surface of a CPU's integrated heat spreader is all it takes.



A fan pointed in the wrong direction can cause all sorts of problems. Fans typically have arrows on their frames that show the directions of airflow and blade rotation. Use them to ensure proper installation.

have a capacitor that butts up against a chipset heatsink, data cable, or even another capacitor on a motherboard. When inserting expansion cards (or even drives, for that matter), take your time and don't put undue pressure on surrounding components.

Often times, less savvy users upgrade components in their rigs without thinking about the effects the upgrade will have on other parts of the system. Power supplies and RAM, for example, are particularly dependent on other parts of a system.

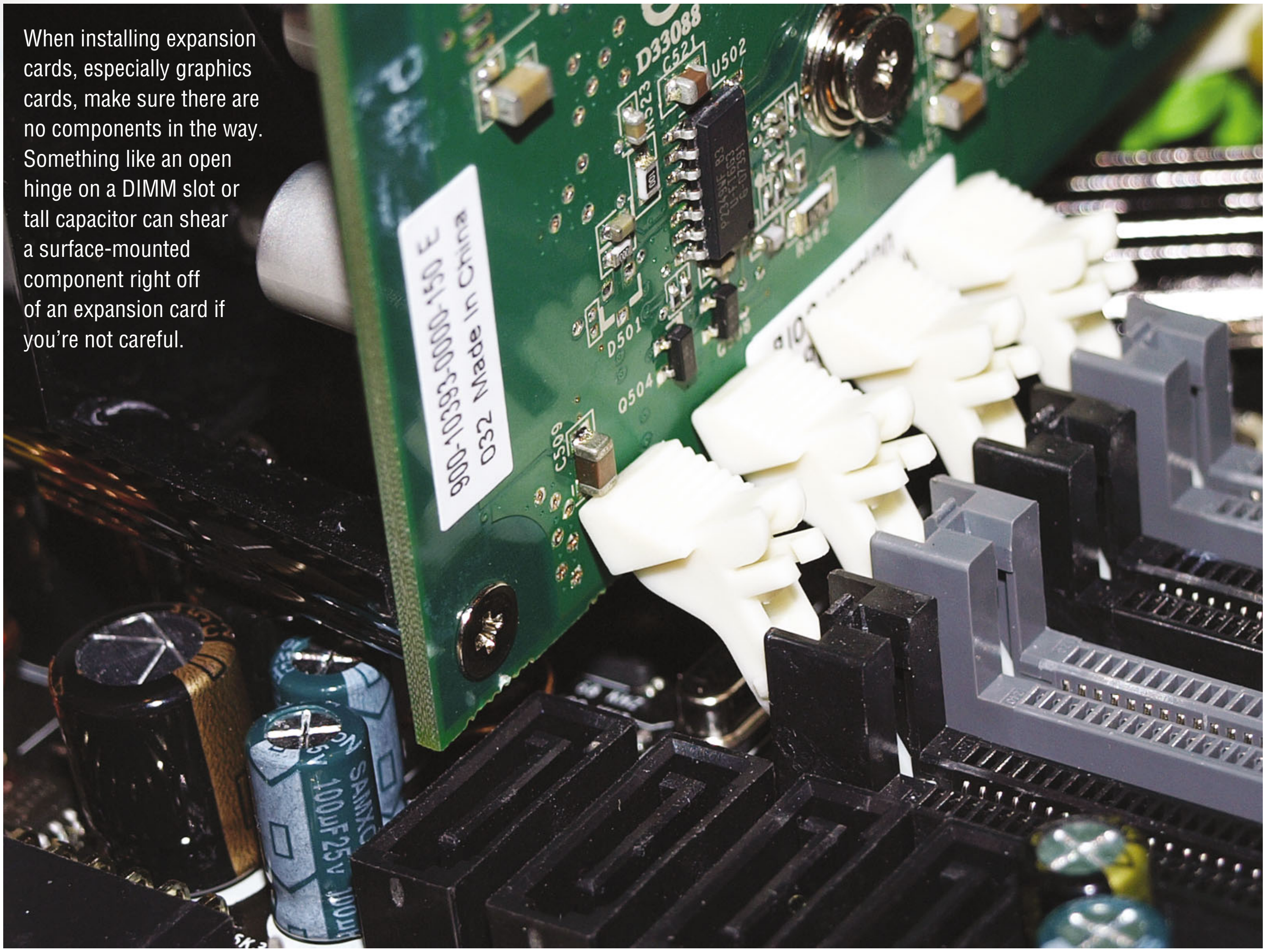
Let's say a user has a 450W power supply that's been humming along nicely since he built the machine a few years ago. But over the course of the system's lifetime, that user has added a couple of drives and a second video card to his rig. Eventually, the PSU will no longer be able to supply sufficient power to the entire system.

Processor upgrades can also pose a problem for some types of RAM. Let's use a system with a processor that has an 800MHz FSB and DDR2-533MHz RAM as an example. The system functions properly in this configuration because the motherboard in the machine has the necessary dividers to run the RAM at its rated frequency when used with this type of CPU. But if you upgrade the CPU to one with a 1,333MHz FSB, the motherboard may be able to run the RAM as low as 533MHz longer. Always check your components for compatibility with a potential upgrade: It's a rule so obvious that it's often forgotten.

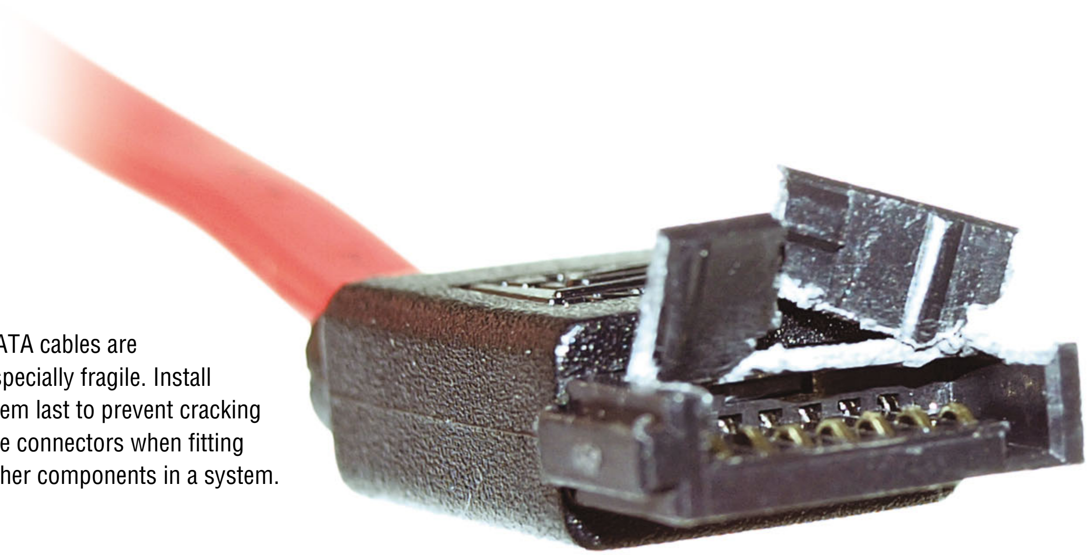
One of the most common problems associated with upgrading (or repairing) a PC is an improperly seated component. Whenever you install an expansion card or RAM, be sure the card or DIMM is seated properly in its slot and that its retention mechanism is secure. Also be aware that over-tightening some screws, like those used to hold expansion cards in place, can sometimes cause the back of the card to tile upward, unseating it from its slot.

As we've already mentioned, some upgrades are completely dependent on other components in a system to function properly. CPU upgrades in particular can be tricky, because the motherboard used in a system may lack support for the processor, especially if it was released after the motherboard's last BIOS update.

If you buy one of AMD's quad-core Phenom processors, for example, and install it into an older socket AM2 motherboard with a BIOS revision older than the CPU, the motherboard may not be



When installing expansion cards, especially graphics cards, make sure there are no components in the way. Something like an open hinge on a DIMM slot or tall capacitor can shear a surface-mounted component right off of an expansion card if you're not careful.



SATA cables are especially fragile. Install them last to prevent cracking the connectors when fitting other components in a system.

able to identify the CPU; consequently, it won't boot. In situations like this, it may be necessary to install an older processor and upgrade the motherboard's BIOS before installing the new CPU.

But it's not just processor upgrades that you have to worry about. New motherboard BIOSes sometimes incorporate compatibility fixes for other components, such as video cards, drives, and RAM. If you have a motherboard, or plan to purchase one that doesn't explicitly list support for a certain component, check for a BIOS update that may do the trick.

Avoid Cabling Chaos

Neatly arranging and routing cables through a system is a great way to improve air flow and enhance a rig's aesthetic appeal. But some cables are more fragile than others, requiring some finesse to work with. SATA cables, while thin and preferable to bulky IDE cables, are also easy to break.

Before powering up a system, make sure all of its add-in cards are seated properly in their slots.

If you're a stickler for good cable management, we recommend installing SATA cables last in a system and putting the least amount of pressure possible on their connectors. With just a slight push from a thick PSU cable or nearby component, it's easy to snap a SATA cable's outer shell. We suppose breaking a cable is better than damaging the drive's connector, but why not avoid damaging anything in the first place?

Another common item used to manage cables within a system is adhesive tie-downs. They have a sticky tape on one side that will adhere to any flat surface, and you can run zip-ties through them to tie down bundles of cable. The adhesive on some tie-downs won't stand up well to the heat generated inside a typical PC. If you plan to use adhesive tie-downs, don't use the cheap ones. Instead, head to an auto parts store and grab tie-downs rated for higher temperatures. They'll hold up well and won't pop off when the system heats up. ▲

by Marco Chiappetta

THE RIGHT TOOL FOR THE JOB

If we've said it once, we've said it a thousand times: Always use the right tool for the job. There's no better way to ensure a smooth mod or improve the ultimate quality of the outcome than to do a job right the first time. And that means always using the proper tools.

We know that many of you may have the desire to do some hardcore modding but don't own the necessary tools. To that end, we assembled a handful of our favorite modding tools. If you're in the market for some tools to fill a modding toolbox, here are a few that will come in handy for a number of different mods.

Fluke 561 Infrared And Contact Thermometer

How can you tell if a cooling mod is working as planned? Check temperatures, right? Yes, many motherboards have sensors to do just that, at least for things like the ambient case and CPU temperatures. And most of today's high-end graphics cards have built-in thermal probes, as well. But what good are they if you want to check the temperature of a different component?

To ensure that a cooling mod is going to plan, you need a way to check the temperature of any component in an instant. A tool like the Fluke 561 Infrared and Contact Thermometer will do the trick. As its name suggests, the Fluke 561 has the ability to measure temperatures using both infrared technology and physical contact. With this tool, users can check ambient temperatures quickly and surface temperatures of hard-to-reach components within a system. The Fluke 561 can also be used in conjunction with any industry-standard type K mini-connector thermocouple probe for checking temperatures of components that the infrared beam can't reach (such as underneath a memory stick's heat spreader, for example).

561 Infrared And Contact Thermometer
$149
Fluke
www.fluke.com
●●●◖

Cables to Go Computer Repair Tool Kit

Most mods begin with some type of basic disassembly that requires common tools like screwdrivers, nut-drivers, or pliers, which is why every modder needs a full set of standard tools. Cables to Go's Computer Repair Tool Kit features the following: precision screwdrivers, 6-inch wire stripper pliers (0.2 to 0.8mm), an electrical test screwdriver, a soldering iron and stand, a desoldering pump, 25-piece bit set, 5-piece socket set, 5-inch side cutter pliers, 6-inch long nose pliers, ratchet driver, 8-piece mini-electronic combination wrench, and a few more odds and ends. All this is contained in a compact case. We're particularly fond of these kits because they make it easy to keep all of the tools organized in one place, which makes modding that much easier.

Computer Repair Tool Kit
$74.99
Cables to Go
www.cablestogo.com
●●●

Sunbeam PSU Modding Toolkit

Whether aesthetics or good airflow is your priority, a system's power supply poses a problem. Unless the PSU is completely modular, the sheer number of wires and connectors coming from a typical unit can be a cable-management nightmare. If you're the courageous type and are comfortable modding a PSU to remove connectors, shorten cables, or sleeve cabling, Sunbeam's PSU Modding Toolkit is a must.

The PSU Modding Toolkit includes four specialized tools. One removes the pins from male and female Molex peripheral power connectors; a second handles floppy and 3- and 4-pin fan connectors; the third tackles auxiliary 6-pin power connectors; and the last removes pins from 20- and 24-pin ATX power connectors. With the four tools offered in the Sunbeam Tech PSU Modding Kit, you can quickly modify a PSU without damaging any of its connectors, pins, or receptacles.

PSU Modding Toolkit
$13.99
Sunbeam
www.sunbeamtech.com
●●●

Black & Decker Smartdriver LI3000

If you've ever spent an entire day working on a PC with a traditional screwdriver, you know the elbow pain and eventual soreness that comes from loosening and tightening hundreds of screws by hand. To eliminate the fatigue and work faster, do yourself a favor and invest in a compact cordless screwdriver. Black and Decker's Smartdriver LI3000 3.6V Li-Ion cordless screwdriver is a useful tool for modders, thanks to its compact size and wall-mountable charging stand. Keep the Smartdriver plugged in and resting in its base, and it'll always be fully charged and ready to go. The tool's compact, gun-shaped design makes it a perfect fit for PC modders. And at less than 40 bucks, it won't break the bank. ▲

Smartdriver LI3000
$39.99
Black & Decker
www.blackanddecker.com
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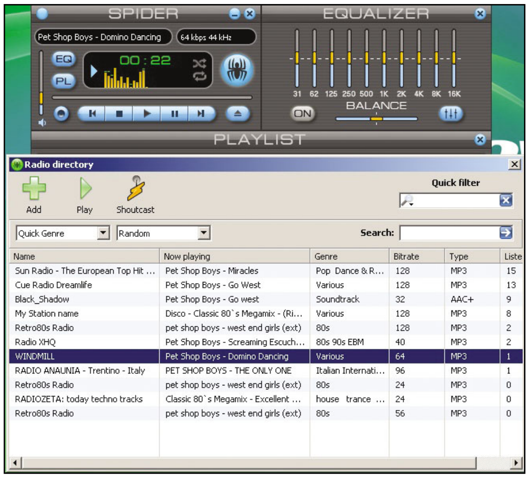
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

The Bleeding Edge Of Software

Inside The World Of Betas

SpiderPlayer 2.2 Beta 6



Name	Now playing	Genre	Bitrate	Type	Liste
Sun Radio - The European Top Hit …	Pet Shop Boys - Miracles	Pop Dance & R…	128	MP3	15
Cue Radio Dreamlife	Pet Shop Boys - Go West	Various	128	MP3	13
Black_Shadow	Pet Shop Boys - Go west	Soundtrack	32	AAC+	9
My Station name	Disco - Classic 80`s Megamix - (Ri…	Various	128	MP3	8
Retro80s Radio	pet shop boys - west end girls (ext)	80s	128	MP3	2
Radio XHQ	Pet Shop Boys - Screaming Escuch…	80s 90s EBM	40	MP3	2
WINDMILL	Pet Shop Boys - Domino Dancing	Various	64	MP3	1
RADIO ANAUNIA - Trentino - Italy	PET SHOP BOYS - THE ONLY ONE	Italian Internati…	96	MP3	1
Retro80s Radio	pet shop boys - west end girls (ext)	80s	24	MP3	0
RADIOZETA: today techno tracks	Classic 80`s Megamix - Excellent …	house trance …	24	MP3	0
Retro80s Radio	pet shop boys - west end girls (ext)	80s	56	MP3	0

Official Product Name: SpiderPlayer

Version # Previewed: 2.2 Beta 6

Publisher: VIT Software

Developer and URL: VIT Software, spider-player.com

ETA: Q2 2008

Why You Should Care: Searching for Internet radio tunes has never been easier.

Though there's no shortage of media players, there are only a few that stand out from the crowd. SpiderPlayer stands out, not because of one or two killer features, but because of a nice combination of lots of sweet little features that might give Winamp a run for its money.

SP looks a lot like Winamp, though individual elements are a little larger and the default skin looks a little cruder. Like Winamp, there's a playlist pane and equalizer pane. Like Winamp, you can load and save playlists. And like Winamp, there are quite a few visualizations to keep your music visually interesting.

Unlike Winamp, SP has a huge, searchable list of Internet radio stations, and they're not only searchable by station name and musical genre, but also by the song or artist name currently being played. For example, if you type "Weird Al" into the search field, SP can show you that there are six stations playing one of Al's songs *right now*. Double-clicking the station starts playing it. The search list is automatically updated in real time.

SP also makes a darn good ripper and transcoder, being able to convert AACs into MP3s, OGGs, and many others, and effortlessly converting CDs into whatever format you choose. It can also record Internet radio broadcasts into MP3s, but there are some caveats: One, you must pay for the shareware version rather than the free version, which runs $19.95, and two, it won't save any ID3 information into the recording's headers. Fortunately, SP comes with a good ID3 tag editor, as well.

We found the beta version to be fast, stable, and conservative with CPU resources and RAM, making it a worthwhile choice for playing your music library outside of iTunes. ▲

by Warren Ernst

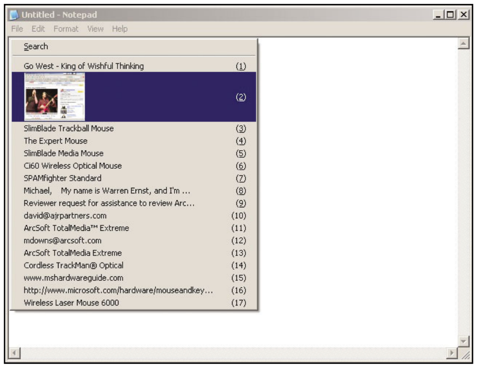
ClipX 1.0.3.9c Beta

Sometimes it seems a little hard to believe that we're running computers with multiple gigabytes of RAM and probably hundreds of gigabytes of hard drive space, but our primary operating system only has one clipboard. Fortunately, there's ClipX, which makes the ridiculously simplistic Windows Clipboard a lot more useful, yet it does so unobtrusively and for free.

Like many Windows Clipboard enhancers, ClipX allows for multiple Clipboards. Just highlight text or select graphics and copy them to the Clipboard as usual, but instead of immediately pasting it, copy something else. Each copied item goes into ClipX's "stack," ready to be pasted.

The regular method of Pasting (CTRL-V or Paste from the Edit menu) pastes the most recently copied item. One of two alternative methods (Winkey-INSERT or Winkey-V) pops up a menu that displays the last couple dozen copied items, including thumbnails of graphics. Hotkeys next to each clipboard item eliminate any need to take your hands off the keyboard to grab the mouse.

But wait, there's more! You can program ClipX with commonly pasted items, like your name or address. You can search for highlighted words with Google with a single key press. You can save Clipboard entries between reboots automatically and edit and combine clipboard entries for later pasting. You can even reprogram hotkeys, such as CTRL-ALT-V, for pasting from the stack, or even to paste items several positions deep in the stack automatically. Amazingly, ClipX takes up less than 300KB of memory while in use and virtually no CPU time, making it indispensible even on older or slower systems. And unlike some commercial alternatives, it works within Office 2007.



Go West - King of Wishful Thinking (1)
(2)
SlimBlade Trackball Mouse (3)
The Expert Mouse (4)
SlimBlade Media Mouse (5)
Ci60 Wireless Optical Mouse (6)
SPAMfighter Standard (7)
Michael, My name is Warren Ernst, and I'm … (8)
Reviewer request for assistance to review Arc… (9)
david@ajrpartners.com (10)
ArcSoft TotalMedia™ Extreme (11)
mdowns@arcsoft.com (12)
ArcSoft TotalMedia Extreme (13)
Cordless TrackMan® Optical (14)
www.mshardwareguide.com (15)
http://www.microsoft.com/hardware/mouseandkey… (16)
Wireless Laser Mouse 6000 (17)

Official Product Name: ClipX

Version # Previewed: 1.0.3.9c Beta

Publisher: Francis Gastellu

Developer and URL: Francis Gastellu, clipx.org

ETA: Q2 2008

Why You Should Care: There's never been a leaner, meaner, cheaper Clipboard manager.

Though labeled as a beta version, it's hard to see why since it runs so well. ▲

by Warren Ernst

UP TO SPEED

Upgrades That'll Keep You Humming Along

A major Apple TV update brings the iTunes Store to the living room. Netscape Navigator runs aground but gets a final refresh anyway. And the Windows XP Service Pack 3 edges towards completion.

Software Updates

Apple TV Take 2

The promised major upgrade to the Apple TV set-top box supports direct access to the Apple movie store for film rentals and purchases. You can also connect to online photo-sharing libraries and the iTunes podcast directory.

www.apple.com

AVG Internet Security 8.0 RC

The release candidate for the next iteration of AVG protection promises a new scanning engine for viruses, as well as a new scanner for rootkits. It guards against threats via HTTP, email, and instant messaging.

www.grisoft.com

CCleaner 2.05.555

The freeware system optimizer updates the Index.dat cleaning under Vista and increases cleaning performance on NTFS-formatted drives. It fixes an IE cache folder location bug and tweaks its Uninstall tool detector.

www.ccleaner.com

CPU-Z 1.44.1

The power modder's best friend, the diagnostic tool gets preliminary support for the Via Isaiah processor and now supports all Via Model D processors, Via Eden, and C7-D/C7-M. It also fixes the AMD Phenom detection on Vista 64 and handles memory timings on Intel Skulltrail.

www.cpuid.com

Flock 1.1 Beta

The recently released "social browser" now integrates Yahoo! Mail and Gmail more tightly. A Friend Activity feed lets friends know instantly when one has updated shared materials. Picasa photo-sharing has been integrated so you can view, upload, and share photos in the Flock Media Minibar window.

www.flock.com

foobar2000 0.9.5.1 Beta 2

The audio player gets a new default user interface, better UI response and speed, and much faster Album List refreshes with large libraries. The program now remembers the window's positioning of dialog boxes. Pop-up windows now warn you when trying to close the program during conversion tasks.

www.foobar2000.com

Handbrake for Windows 0.9.2

The open-source DVD file converter tool adds Dolby Digital 5.1 audio in MP4 files and multitrack audio for Apple devices. The program handles audio discontinuities better.

handbrake.fr

GPU-Z 0.1.7

The diagnostic tool for GPUs corrects some GeForce 9600 GT readings and adds features for HD 2900 GT and HD 3850 AGP cards. It also adds Rage LT Pro detection.

www.techpowerup.com/downloads

Internet Download Manager 5.12 Build 8

The download accelerator enhances the confirmation dialogs for better file deletion. This version also improves your ability to intercept and take over a download process and add automatic interception for split files.

www.internetdownloadmanager.com

Netscape Navigator 9.0.0.6

Irony of ironies. Even as AOL ends official support for the venerable browser, a last update adds a security fix and a migration tool for moving to the Flock or Firefox browsers. The Weatherbug add-on has been removed. R.I.P.

netscape.aol.com

Windows XP SP3 RC2

Apparently the last of the public beta releases of the official and final SP3 update adds better compatibility between WinXP and networked Vista and Windows Server 2008 PCs. It also rolls up previous standalone add-ons such as the Microsoft Windows Imaging Component, Microsoft Management Console, and WPA2.

www.microsoft.com

Xfire 1.87

The in-game client for gamers fixes bugs and refines the beta video capture feature. A World of Warcraft infoview feature is disabled until developers can fix it in a future version. And in-game support comes to 40 more titles, including Half-Life 2 and Quake 4.

www.xfire.com

Driver Bay

ATI Catalyst 8.2

The latest Radeon drivers promise performance gains in Company of Heroes DX10 across the HD 2x00 and 3x00 cards. These drivers also address a host of Vista compatibility issues involving .NET Framework, the Catalyst Control Center, and World of Warcraft.

www.amd.com

Nvidia nForce 9.46

For the nForce 780i motherboard, this bundle updates the Ethernet driver, network management tools, SMBus driver, and SATA RAID and IDE drivers, along with the RAID tool.

www.nvidia.com

by Steve Smith

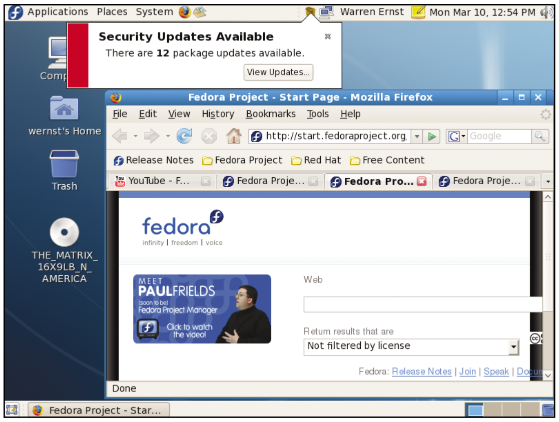
Latch On To Linux

Deca-Distro Dustup

Whether you've heard that there's a better alternative to Microsoft operating systems, or you need to run software that doesn't run under Windows, or you can't afford the latest version of Windows, or perhaps you just like being different, you've almost certainly heard of Linux and maybe now you're getting curious. Welcome to the club; you're in for quite a ride.

The first question you probably have is, "Which version should I try?" The answer, of course, is, "It depends," but we're here to help with that. First, let's get the terminology straight: The different versions are properly called distributions, or "distros" for short, for all Linuxes have at their core essentially the same thing—the Linux kernel famously written and later maintained by Linus Torvalds. Almost none of the mainstream distros are totally unique, with most of them also sharing the hundreds (if not thousands) of supplementary programs and utility files, along with the Desktop environments, with each other. Each distro generally has a unique combination of these files and programs, even if the programs and files themselves are common to most of them: hence the term distribution.

To help sort through the different Linux options, we downloaded, installed, and used 10 popular and somewhat-less-than-popular-but-worthwhile Linux distros, keeping in mind installation ease, features and functionality, ease of use, and performance. In spite of this, be forewarned: There is no "best" Linux distro, and we don't presume we can bestow that title, since each has an intended audience that it was created and tailor-made for, and probably works perfectly in that capacity. Still, our tests might save you a few hours of trial and error, to say nothing of frustration, and should help you narrow your selection to just a few.



Security Updates Available
There are 12 package updates available.

Applications Places System
Warren Ernst
Mon Mar 10, 12:54 PM
View Updates...
Computer
wernst's Home
Trash
THE_MATRIX_16X9LB_N_AMERICA
Fedora Project - Start Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
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Release Notes Fedora Project Red Hat Free Content
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Click to watch the video!
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Return results that are
Not filtered by license
Fedora: Release Notes | Join | Speak | Docs
Done
Fedora Project - Star...

Fedora Core 8
Red Hat
fedoraproject.org
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Fedora Core 8

There was a time when Red Hat's Linux was The Standard in free, general-purpose distros, but Red Hat is now commercial, and Ubuntu has moved to the forefront in the popular media. Still, most of the work that goes into Red Hat is displayed in its open-source cousin Fedora Core 8, and it is a worthy competitor, in many ways the standard by which other Linux distros are judged.

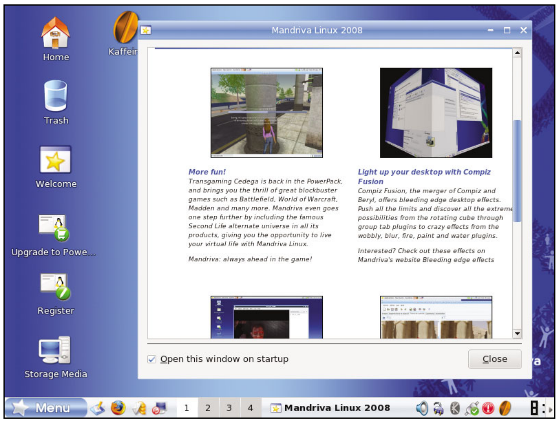
Like Ubuntu, Fedora is available with both the Gnome and KDE Desktop environments, though Gnome is what comes with the "standard" version. Fedora was a little later than most distros in offering a LiveCD, which is a bootable CD that you can actually run the OS from, either for the purposes of trying out a new version without committing a hard drive to the installation, or just seeing if your hardware is supported. If you like what you see, a Desktop icon installs Linux to your hard drive directly from the LiveCD, but Fedora also offers an installation DVD version which requires less downloading later on. Installation from the LiveCD takes but a few clicks to answer some simple questions asked in plain English, and the resulting installation automatically tries to get online and download updates.

Fedora Core makes a point of being pure open source, so some multimedia codecs aren't installed by default, for example, and it's up to you to install the Flash plug-in for Firefox. Both are easily accomplished, but it's a hoop to jump through.

Red Hat's done its GUI homework, making Gnome look smooth and slick with attractive colors and fonts, but it's a little light on applications from the get-go. Fortunately, the RPM-compatible Package Manager lists thousands of programs (and their dependencies) which download and install with just a few clicks, and most third-party Linux programs are available in RPM packages that make installation simple. A huge and helpful user base frequents the FedoraForum.org, so there's always plenty of help available.

Mandriva Linux One 2008.0

Mandriva Linux used to be called Mandrake Linux, which was born in 1998 with the original goal of making a version of Red Hat Linux that was easy for beginners to grasp, and it's been closely coupled to the KDE desktop environment from the very beginning. Mandriva also offers a



More fun!
Transgaming Cedega is back in the PowerPack, and brings you the thrill of great blockbuster games such as Battlefield, World of Warcraft, Madden and many more. Mandriva even goes one step further by including the famous Second Life alternate universe in all its products, giving you the opportunity to live your virtual life with Mandriva Linux.

Mandriva: always ahead in the game!

Light up your desktop with Compiz Fusion
Compiz Fusion, the merger of Compiz and Beryl, offers bleeding edge desktop effects. Push all the limits and discover all the extreme possibilities from the rotating cube through group tab plugins to crazy effects from the wobbly, blur, fire, paint and water plugins.

Interested? Check out these effects on Mandriva's website Bleeding edge effects

☑ Open this window on startup
Close

Mandriva Linux One 2008.0
Mandriva S.A.
www.mandriva.com
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commercial version of Linux called Mandriva Linux Powerpack, but we looked at the free Mandriva Linux One, which includes a fair bit of non-open-source software, such as video codecs, ATI and Nvidia video drivers, and the like.

In many ways, Mandriva seems a lot like a "Linux Newbie's Fedora," which isn't at all a bad thing. KDE looks and feels a bit more like Windows than the Gnome environment (Gnome generally appears more elegant and Mac OS X-like), and dialog boxes and Help files have better descriptions of what different options do. The Mandriva Linux Control Center does a great job of combining hardware configuration and OS settings into one handy control panel—you're not constantly searching for how to do things. There's also a lot more software installed by default, such as OpenOffice and GIMP. The built-in software manager, used to easily add and remove programs, is better divided into categories, which encourages browsing and experimenting. For software not listed, Mandriva is compatible with the RPM software installation system that Red Hat pioneered, so adding extra software is straightforward, and software updates are basically automatically applied.

Though Mandriva needs less tinkering to get rolling with, it feels just a few ticks slower than Fedora. You'll probably never notice it on a newer system, but if you're recycling something older like a Pentium III, the difference is definitely there. With a brand-new system, the combination of proprietary drivers and the new 3D desktop options of Compiz Fusion or Metisse looks awesome and is sure to impress. Fedora can do it too, but Mandriva makes enabling it easier.

OpenSUSE 10.3

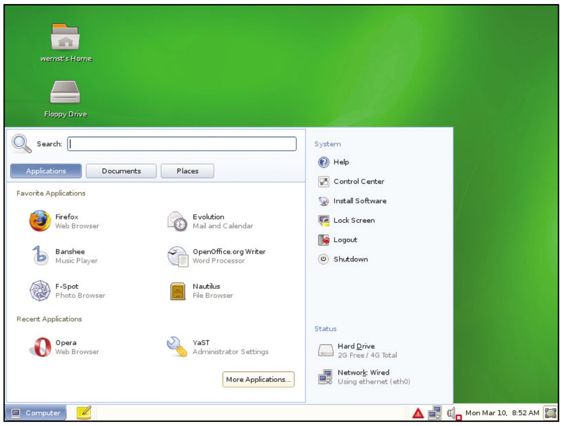
SUSE was originally one of the oldest distros, but Novell purchased and reswizzled it for its own purposes. OpenSUSE is the Novell-sponsored free version, and like its competitors, offers a LiveCD that both lets you try it out and install it to a hard drive. Also, like some of its competitors, it's available with both Gnome and KDE environment-based versions (and in fact, you can install the other environment later via extensive downloads, which is also common). But the Gnome environment is considered the default choice. Whereas most of the Gnome desktops look and feel pretty much the same between the different Gnome-based distros, OpenSUSE has made significant layout changes to make Gnome seem a little more like Windows, and we think it's a rousing success.

What basically amounts to a Start menu (though it's labeled Computer) is your gateway to launching programs, opening files, and configuring the system. It is divided into three Tabs (Programs, Files, and Places), and the icons underneath them automatically change to reflect your most commonly used and accessed programs and files. A Beagle-based file searcher (think Google Desktop Search for Linux) runs along the top of the menu to help find other programs and files, while links along the right of the menu provide quick access to common tasks such as shutting the system down, checking for updates, or getting help. OpenSUSE similarly organizes Gnome's somewhat slapdash arrangement of system tools and control panels within Yast, which is nice enough that you wonder why other Gnome distros aren't doing the same thing.

Yast also handles software installation and downloads, and its categorization of programs encourages exploration. It can install RPM files automatically, too. Yast also handles automatic updates, which work well, if slowly at first. Generally, performance is very good, and the large preinstalled software library is useful to get working fast.

PCLinuxOS Gnome Edition 2.21.2

Designed to be "Radically Simple," PCLinuxOS has two versions: one with KDE and one with Gnome, though the Gnome version is significantly newer, so that's what we tested. Indeed, PCLinuxOS looks and feels like a slightly older version of Ubuntu slapped about the head and neck with a Simplicity Stick, whereas Ubuntu tries to be a more general-purpose OS and keeps its options more open.



OpenSUSE 10.3
Novell Inc.
www.opensuse.org
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◖ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT

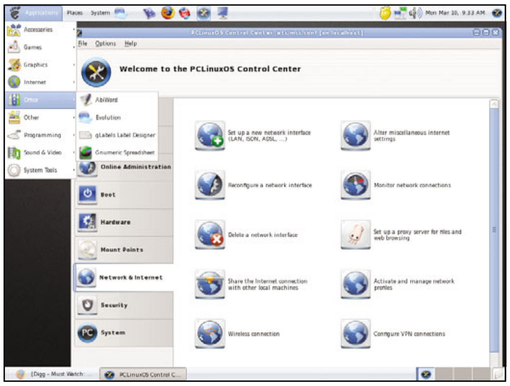
The biggest change is that PCLinuxOS isn't afraid to bundle nonfree programs and utilities into its distro or its default software manager, which makes initial setup for "typical" home users easier. Browser plug-ins for Flash and QuickTime movies just work out of the box, along with codecs for pretty much every video and audio file format in a user's library. The Synaptic Package Manager, also shared with Ubuntu, is already configured to automatically download non-open-source ATI and Nvidia drivers, non-open-source programs such as Opera, and non-legal-for-American-consumption libdvdcss libraries necessary to play commercial DVDs. No other distro makes working with multimedia so painless.

Some other choices the PCLinuxOS team made are slightly annoying. There's no automatic updater, leaving you to run Synaptic and click a few toolbar buttons to check for, download, and install updates, which in this day and age is almost a security vulnerability in and of itself. The PCLinuxOS Control Center does a fabulous job of centralizing all of Linux's and Gnome's setup and configuration options, but otherwise Gnome is laid out like most other Gnome-based distros, which is to say, just a little too spread out with too many menus. One wishes PCLinuxOS had gone all the way with simplifying Gnome as OpenSUSE did.

Dreamlinux 2.2 Multimedia GL Edition

Dreamlinux is a study in contrasts. It aims to be both lightweight yet thoroughly complete, both simple to configure and use yet have enough options to be a general-purpose distro. Paradoxically, it both succeeds and fails at all of these.

The GUI uses XFCE, a lightweight graphical Desktop that is speedy on slow machines, really flies on new computers, and is configured to resemble Mac OS X, right down to a Dock-like launcher called Engage. In addition, there's a Start-like menu along the top of the screen, sensibly categorizing its large list of programs and utilities in a way that makes them very easy to locate. The arrangement is a little schizophrenic, but it works and looks slick.


Applications
Places
System
PCLinuxOS Control Center
Welcome to the PCLinuxOS Control Center
Boot
Hardware
Mount Points
Network & Internet
Security
System
Set up a new network interface (LAN, ISDN, ADSL, ...)
Alter miscellaneous internet settings
Reconfigure a network interface
Monitor network connections
Delete a network interface
Set up a proxy server for files and web browsing
Share the Internet connection with other local machines
Activate and manage network profiles
Wireless connection
Configure VPN connections

PCLinuxOS Gnome Edition 2.21.2
PCLinuxOS
www.pclinuxos.com
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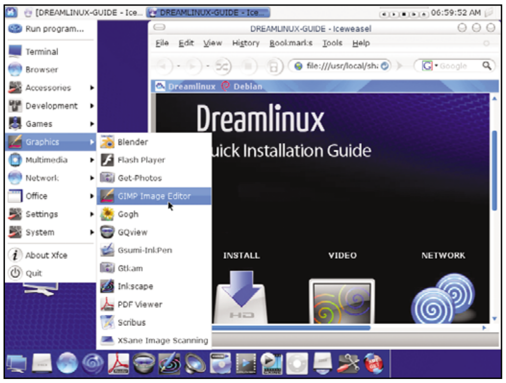
Almost every multimedia codec, video driver, application, and browser plug-in is already installed, configured, and ready to go, almost making Dreamlinux a one-stop-shop for music and videos. The problem is getting to that point: Installation is decidedly trickier than with other distros, requiring the user to know a little something about hard drive partitions and how Linux keeps track of them. Anyone with Linux experience can navigate through the installation easily, but beginners will be scratching their heads for a little while, resorting to trial and error. Being a Live-CD, the best way to get started is to boot from it and let Linux start, then fire up the Web browser (named IceWeasel, which is a Firefox variant), and read through the default home pages, which go a long way to explaining how things work.

The Debian- and Ubuntu-sourced Synaptic package manager handles software installation and updates, but like PCLinuxOS, it's up to you to keep the system up-to-date. Version 3 of Dreamlinux should be out by this summer, and based on how version 2.2 works, it will be worth a hard look when it's released.

Ubuntu 8.04 LTS Alpha 6

In a relatively short time, the Debian-derived Ubuntu Linux has become the most popular distro around, and the hype is generally well deserved. Though there are specific areas where other distros might be better suited to specific tasks, overall, Ubuntu is about the perfect blending of general purpose utility and ease of use, with a vigorous user base participating in active support forums to solve problems quickly. Canonical, Ubuntu's sponsor, acts like a benevolent dictator, enforcing a look and feel and feature set that has to a certain extent standardized what some saw as "unstandardizable."

We looked at a late Alpha of the next version of Ubuntu, since it would be released by the time you read this, and find much to recommend. Newly included is Wubi, an installer that works within Windows by installing Ubuntu within a folder in a Windows-formatted hard drive, allowing for seamless uninstallation and no partitioning hassles. Though technically slower than a "standard" Linux installation, we were hard-pressed to see it, and predict many other distros will be utilizing



DreamLinux 2.2 Multimedia GL Edition
Dreamlinux
www.dreamlinux.com.br
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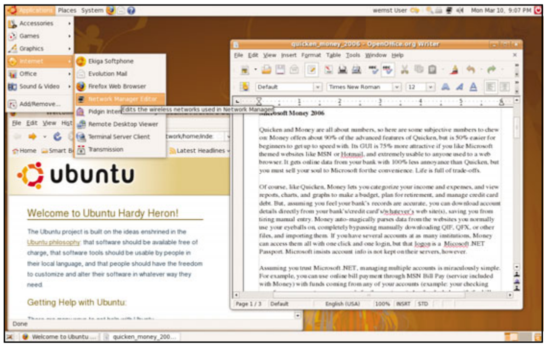
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◐ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT


ubuntu
Welcome to Ubuntu Hardy Heron!
Getting Help with Ubuntu
quicken_money_2006 - OpenOffice.org Writer

Ubuntu 8.04 LTS Alpha 6
Canonical
www.ubuntu.com
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Wubi in the future due to its simplicity, convenience, and speed.

Ubuntu comes with a huge library of software preinstalled, but in keeping with the open-source philosophy, proprietary drivers, codecs, and programs are both missing and not automatically available from the Synaptic Package Manager. Relatively painless instructions for manually adding these to Synaptic are widely available, but it's a needless hassle from an end-user standpoint.

Gnome is Ubuntu's default Desktop, but KDE and XFCE versions are also available, and easily installable on the Gnome version. Gnome is basically set up in its default configuration, rather like Fedora, so it looks clean but is arranged a little strangely compared to Windows.

Gentoo 2007.0

Gentoo is named after the fastest penguin in the animal kingdom, and since its goal is to be the fastest Linux distro in the computing kingdom, this is no coincidence. In many ways, Gentoo feels like the best distros of yesteryear, though it isn't because it uses old programs. In fact, the latest versions of Gnome, OpenOffice, and Firefox all come with the Gentoo LiveCD; the difference lies somewhere deeper.

Gentoo is designed to be complied onto your system, taking advantage of all the speed optimizations the specific model of CPU in your PC has to offer. Though this results in an installation that takes two or three times longer than other distros, it also results in a system that runs faster than distros with precompiled executables set to run on any old x86 processor. We don't have exact benchmarks, but expect a 10% improvement.

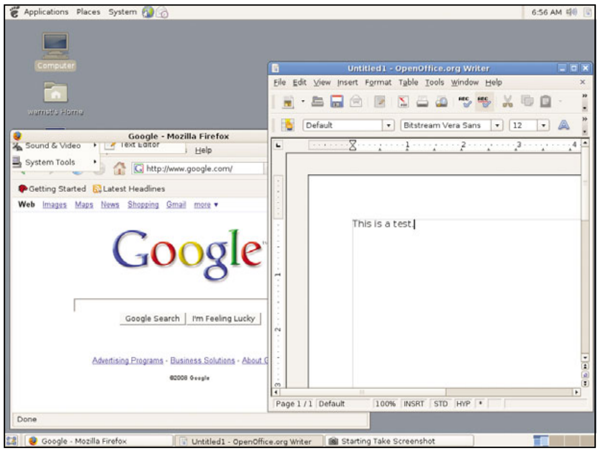
If you're the kind of person who gets excited over a 10% speed improvement, then you're probably also the kind of person who'll overlook some annoyances that are a part of the Gentoo deal. Installation is somewhat of a trial-and-error affair, with the installer offering to download sources and kernels from the Internet, but the only successful installation we had used everything from the LiveCD, and even that asked questions we had to look up the answers for. Gentoo's package management system, Portage, also works by downloading source files and compiling them, which is a slow and tedious process, as are general system updates.

Gentoo comes with Gnome by default, and it enjoys virtually no customizations nor any attempt to make it look especially attractive. Again, if you're looking for speed, this is probably for the best, and you can always add eye candy yourself later on, but Gentoo will become something of a hobby rather than a productivity tool for most.

gOS 2.0 Beta

One of the few high points of the $200 Everex gPC has been its operating system, called gOS. This unofficially stands for "Google Operating System," but while Google doesn't really have anything to do with this Ubuntu-based distro, they've seen it and approve of it. gOS is designed to breathe as much life into a $200 PC as possible, and as such, it runs pretty well on older hardware and exceedingly well on new stuff.

gOS uses Enlightenment (a low-resources Desktop manager), massaged and tweaked to look like an Emerald City version of Mac OS X, complete with a Dock filled with icons. Those icons point not to programs on the hard drive, but popular Web sites such as Google and YouTube. It also points to Web sites that can fill in for programs on the hard drive, such as Google Documents (instead of Open Office or Abiword), and popular Google-owned sites such as Google Maps, Google Talk, and Google Calender.



This is a test

Gentoo 2007.0
Gentoo Foundation
www.gentoo.org
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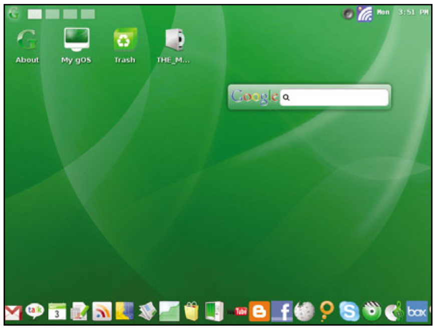

gOS 2.0 Beta
Good OS
www.thinkgos.com
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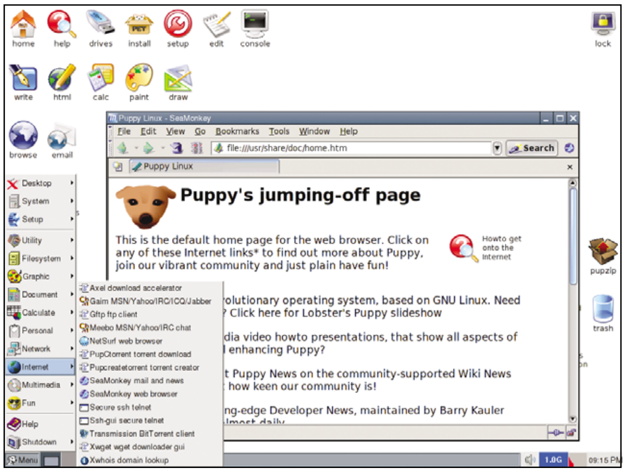
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

There are also icons for Skype and Wikipedia, along with media players. If you don't have a broadband connection, then gOS doesn't make a lot of sense, but if you do, then these alternatives to traditional desktop applications are viable.

Owing to its Ubuntu heritage, gOS is compatible with, and set up to use, most of Ubuntu's software repositories, so installing other software is a snap. In fact, most of Ubuntu's default software is also available via the G menu, which functions sort of like a Windows menu but with more hierarchical organization. Most media playback codecs are also already installed automatically, and the installer is among the easiest to follow.



Puppy's jumping-off page

This is the default home page for the web browser. Click on any of these Internet links* to find out more about Puppy, join our vibrant community and just plain have fun!

PuppyLinux 3.01
Barry Kauler
www.puppylinux.org
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PuppyLinux 3.01

PuppyLinux is one of two distros we looked at specifically designed to run on very constrained hardware, and just to prove a point, we checked it on appallingly old hardware (Celeron 366, anyone?) in addition to more modern stuff. Like the other LiveCDs, you can install it to a hard drive, but PuppyLinux is less than 100MB and will happily load itself completely into RAM from the CD (where it is much faster than any other LiveCD), or you can even install it to a USB thumbdrive (which allows it to save its settings for later sessions) or inside Windows with its Puppy on Windows feature.

To keep things lean and mean, PuppyLinux uses lightweight applications wherever possible, such as Abiword instead of OpenOffice, and files are normally stored compressed, automatically decompressing to run "just in time." Despite this, there is a huge range of applications already installed, including image editors, instant messengers, browsers and emailers, and multimedia players. Window management is handled by JWM, which looks like a primitive version of Windows 95, but it gets the job done.

Version 3 is basically a clean-slate approach to Puppy, and this new version is installer-compatible with Slackware packages, though adding much extra software is not exactly in keeping with the PuppyLinux spirit. Still, it makes adding a required application relatively easy, and makes the whole distro something you can stored on a 256MB thumb drive for Windows emergencies, or to keep otherwise useless hardware in service.

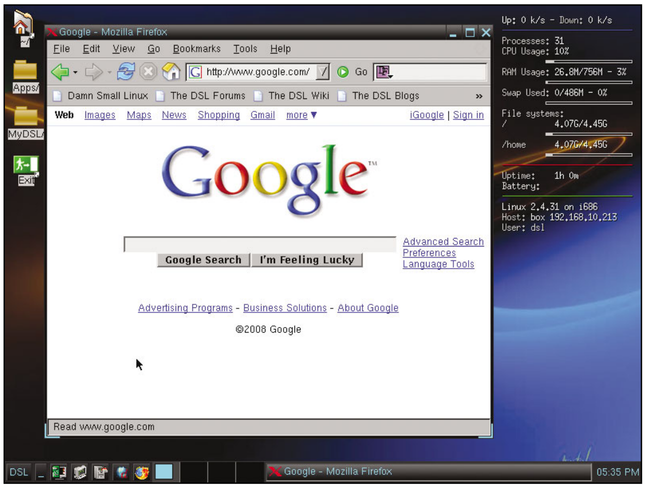
Damn Small Linux 4.2

For users who feel PuppyLinux is too darn frivolous and takes up way too much space, there's Damn Small Linux (affectionately but confusingly called DSL by its users), which only takes about 50MB of space and can run on a system as meager as a 486DX with 16MB of RAM. The LiveCD loads entirely into RAM, which makes it fast, but you can also install it onto thumb drives, superfloppies, or zip drives, or even within an emulated space within Windows via QEmu. If installed onto a hard drive, it basically becomes a Debian-based system.

DSL still runs an older kernel (version 2.4), so it might not completely support brand-new hardware very well, but most DSL users are looking to repurpose older hardware anyway. Included software is somewhat meager too, including Firefox 1.06 for Web browsing, Sylpheed for email, and a basic collection of graphics, text, and multimedia apps. There's no terribly simple way to add applications, and a "MyDSL" package only adds about 50MB of extra programs to a thumb drive installation of varying usefulness. The GUI, based on Fluxbox, sort of resembles Windows 95 but without all the eye candy—which is to say, things look very basic.

Of course, if you need to get a 486 with 16MB of RAM on the Internet, you don't have that many other options, but if your computer is even slightly newer, you really do. ▲

by Warren Ernst



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Up: 0 k/s - Down: 0 k/s
Processes: 31
CPU Usage: 10%
RAM Usage: 26.8M/756M - 3%
Swap Used: 0/486M - 0%
File systems:
/          4.07G/4.45G
/home      4.07G/4.45G
Uptime:    1h 0m
Battery:
Linux 2.4.31 on i686
Host: box 192.168.10.213
User: dsl
```

Damn Small Linux 4.2
John Andrews
damnsmalllinux.org
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SPAMfighter 6.2.9

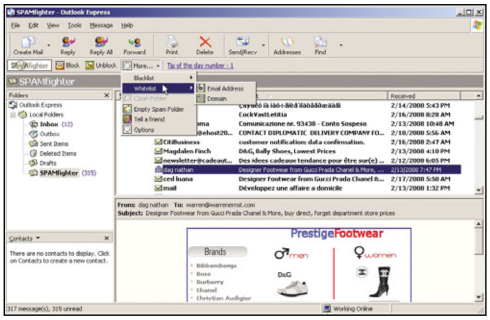
In the war against spam, the average computer user in 2008 is far from defenseless. Most Web mail sites have built-in spam filters, as do many email client programs (with Outlook Express being the glaring, notable exception), and even many ISPs. That said, most use a type of Bayesian spam filtering, and many require training in order to become effective, and spam-authors can sometimes get around them. SPAMfighter Standard and Pro takes a different approach: All of its users work together to tag unwanted emails as spam, and the SPAMfighter program uses the collective data to remove spam from your Inbox automatically.

Working only with Outlook and Outlook Express, SPAMfighter regularly connects to its central server and filters your email as it arrives. Clean messages remain in the Inbox, while spam gets shunted to the SPAMfighter folder. If some spam slips through to your Inbox, just select it and click the Block button in the SPAMfighter toolbar, which banishes the spam and sends a "vote" to the central SPAMfighter database server; if enough SPAMfighter users vote that email as a piece of spam, it gets blocked for the next users. Remove false positives with the Unblock button, and the same voting occurs.

SPAMfighter is amazingly effective right from the start, benefiting from the "training" that millions of other users have already performed. Of 321 test spam mails, it caught 98.4% within one minute of installation. It flagged no personal messages as spam falsely, but it incorrectly trapped 29% of emails, like desired advertising offers and newsletters, which is still pretty good. By using whitelists and blacklists, even these errors could be eliminated with some configuration.

The Pro version, which runs $29 per year, eliminates the toolbar's advertising, allows the automatic removal of all foreign language emails, turns off the SPAMfighter message footer in outgoing emails, and shares the same filtering engine as the free version. Both run remarkably fast and are effective, and both are options for people for whom Bayesian spam filters aren't working. ▲

by Warren Ernst



SPAMfighter 6.2.9
Standard version: Free; Pro version: $29 per year
www.spamfighter.com
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ArcSoft TotalMedia Extreme 1.04

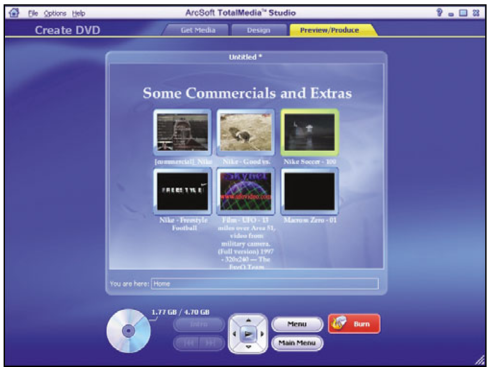
If you think there's hardly any PC hardware for working with HD DVD and Blu-ray Discs, just try finding software: There just isn't much out there. ArcSoft's TotalMedia Extreme comes bundled with several Blu-ray optical drives (referred to as BDs, short for Blu-ray Discs), but it's now available as a standalone retail program, which is handy for bare drives lacking good software bundles. Though it works well with conventional CDs and DVDs, its relatively high cost is really only justified if you need to work with and burn high-definition content and media. When dealing with high-def material, however, you won't find anything as fast and easy as TME.

TME combines several ArcSoft products, all of which are compatible with BD and HD DVDs: TotalMedia Theater (a media player), TotalMedia Studio, StudioVR, and Studio AVCHD (able to record HD video straight to various discs or to create discs complete with DVD-style menus from video files, along with basic video-editing abilities), TotalMedia Backup (for data backups to various optical discs), TotalMedia Record (which is mostly intended for ripping and burning audio files and music CDs), and a set of utilities for making ISO images, burning discs from said image files, and disc duplication. All these utilities are grouped by capability within a well-crafted and intuitive common interface that encourages exploration and tinkering.

Simple wizards step you through basically every task available, so TME's almost nonexistent Help files are not really a hindrance to getting things done. We had no difficulty taking HD recordings captured with an HD digital tuner, creating chapters, creating a menu with bookmarks, and then burning the disc. Ripping audio CDs or copying nonprotected discs was similarly easy, and the movie player has all the bells and whistles you'd expect, including screen captures and surround sound. Data backups are especially easy to set up and schedule, and backup discs include a self-running decompression program.

Certain features are slightly lacking, however. It only rips audio CDs to WMAs, for example, while the data restoration software only works with Windows. Still, TME is a useful package for HD content, though "conventional" definition and DVD users can find similarly useful though less expensive suites elsewhere. ▲

by Warren Ernst



ArcSoft TotalMedia Extreme 1.04
$119.95
www.arcsoft.com/products/totalmediaextreme
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Dialogue Box

by Chris Pirillo

(un)Original Experience Manufacturers

Where did OEMs lose their way? Some might argue that they never did, but others charge them with abandoning the user—their own customer—and riddling them with a never-ending line of products that look, act, and feel the same.

"Well, at least they're not Macs."

Apple is more like a traditional PC OEM than it is like Microsoft, so be careful when you geeks lay claim to Windows desktop dominance. The important number to watch is the number of Mac PCs there are on desks compared to Vendor X's PCs. I assure you, the statistic will make you sit up and take notice. Apple isn't as small as you wanted them to be.

OEMs have to take Apple as a serious threat. Relying on Redmond to deliver a fantastic user experience is just half of the battle they must face. Mac OS X doesn't come with random icons on the desktop, menu bar, or dock. Even the Boot Camp installation of Windows lets you opt-in to Apple's nonessential software. So without some form of true control, what OEMs are offering their customers is a mixed bag (at best). What I see is generally appalling, yet widely accepted as the norm. This isn't just an "Apple vs. PC" thing; it's a "PC vs. User" thing.

Beyond the blame game, OEMs seem intent on infecting PCs with bloatware and needless trials. The reason they do this is obvious: to make money and stay in business. However, I believe these less-than-transparent upsells are an exercise in folly. I've seen more home users look to completely different brands after being "done wrong" by an OEM.

"Why does my new system run slow? I've got two mega-gigs of memory, and this has the latest quadrangle processor."

Granted, these are the same users who install BearShare, LimeWire, Gnutella, *and* Kazaa as soon as they can, thinking they'll be covered with a paltry antivirus app they downloaded for "free" from "bad-spyware-stopping.org." Believe me, it's difficult to stick up for these people who know not what they do, but shouldn't we at least start 'em off on the right foot?

These users' systems run slow not merely because of the legacy code built into the Windows architecture (thanks, enterprise!), but because of the layers of applications stacked on top of the operating system out of the box. I've heard that some electronic superstore customer service centers will offer to clean the junk off of one's new—NEW—system for around $100 a pop! So, OEMs are being paid to place this junk on new computers, and the resellers are charging the customers to remove it at the sales counter. Unbelievable. Un-bleeping-believable.

There has to be a better model, and it all starts by putting the user experience in the crosshairs. It's not the feature, it's the implementation, and if you think that every feature is self-explanatory to everyone, then you probably aren't equipped to carry on a civilized conversation with people who don't know what "RTFM" means.

Let's assume that OEMs bundle crippled demos and pointless software layers because their users ask for it; they love the experience this overlay provides. But frame the question a different way:

"Would you rather have a clean desktop or one cluttered with icons that you'll never use?"

"If we increased performance by x% after removing these applications, would you want us to do that?"

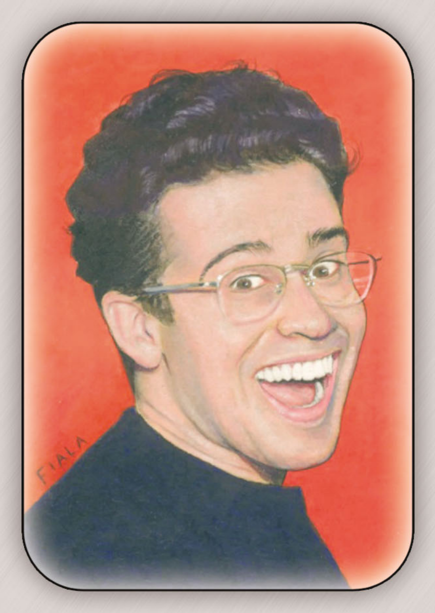
"What can we do to help ensure that you won't leave us for another company who is just as likely to treat you as poorly as we may have treated you?"

OEMs would likely hear a different answer.

While composing this particular article, I received a phone call from my mother-in-law, who, in no less than 45 minutes, explained to me a debacle with an OEM that was still underway. In the later stages, they offered to send her a new hard drive (for her new notebook PC) and talk her through installing it herself. What?!

My mother-in-law is a nurse. How would you like it if you went to the doctor for a serious cough, and instead of being given an injection, she just handed you the needle and told you to poke yourself? Give me a break.

THIS HAS TO END. ▲



Chris Pirillo publishes his thoughts in real time through his live video feed on chris.pirillo.com. (Yes, he's probably doing it right now. You can stop by his chat room if it's not moderated and tell him you just read his article in CPU *and proceed to share your thoughts with him and the rest of the community.) Chris also hosts the Gnomedex tech conference and Lockergnome.com content network where bloggers are compensated directly for their efforts. He also desperately wants to help the PC industry save itself.*

You can dialogue with Chris at chris@cpumag.com

Open Sauce

by Pete Loshin

A Spoonful Of Sugar

OLPC's XO (laptop.org) may be an incredible machine, but despite last year's Give 1 Get 1 program, it's unlikely to reach the retail channel soon. The specs are impressive: low power draw for long battery life, a hardy design to survive abuse from children in climates the world over. But it's Sugar, the XO's custom-designed GUI/interface software, that makes the XO unique.

And Sugar is suh-weet. I know because I've tried it, and you can, too. Go to wiki.laptop.org/go/Sugar for Sugar emulation instructions or wiki.laptop.org/go/LiveBackup_XO-LiveCD for Sugar LiveCD, which is much easier to install and use. The LiveCD's status keeps changing. Last year it was up and easy to find; last month it was "obsolete." For now, it's current, but the problem is that I can't see the LiveCD version as any more than a low priority for the project as a whole.

Pete Loshin publishes LinuxCookbook.com, a place to learn even more about Linux. And don't forget to check out the new Ninitata.com, Pete's family-friendly fun and learning site.

According to OLPC, Sugar is "the core of the OLPC Human Interface." The goal is to make the XO a "fun, easy-to-use, social experience that promotes sharing and learning." Sugar, which runs on top of Fedora 7, is different from most GUI/desktop environments: There are no applications, just activities. "Presence is always present"; Sugar turns the XO into a "thing to think with"; and Sugar's Journal automatically tracks all activities and data.

Contrast "activity" with "application." I use lots of apps—email, Web browser, word processor, text editor, outliner, clipboard history utility, file browser, graphics editing/browsing, screenshot program, audio player, CD/DVD burner, etc. I'd rather have all the tools at hand for each of my primary activities, such as blogging, doing research, and participating in conference calls and online meetings, than have to open all those different applications while working on a particular project. Sugar lets me track my work with the Journal, which automatically tracks where I've been browsing, content I've been looking at, and changes I've been making on my projects. The Journal replaces more traditional but less intuitive file storage applications; it tracks where your data files are stored and lets you track related files by project or activity.

Even better, Sugar lets developers cobble together their own activities from a variety of applications. For example, I might create an "article writing" activity that integrates simple word processing/note taking/outlining functions with Web browsing, image editing, CD burning, and screen capturing. With Sugar's always-on network collaboration features, I could grant editors permission to access notes, references, early drafts, even allow them to make suggestions in real time.

Some of Sugar's core "activities," such as Write (based on the venerable Abiword) and Browse (based on Firefox), smell very much like applications, but most Sugar activities, such as Story Builder, Joke Machine, Cartoon Builder, Stopwatch, and Poll Builder (all self-explanatory), shift focus away from applications to activities. For example, kids learn Python programming with Pippy, which combines a code browser, program editor, and interpreter. Younger kids use the Logo work-alike Turtle Art to drag, drop, and snap together flowchart-style instructions that control the "turtle."

TamTam, the music/sound suite, illustrates the difference between app and activity. TamTam Mini lets toddlers choose an instrument and play notes; TamTam Jam gives older kids more features, including collaborative group playing. TamTam Edit does event sequencing and composing on up to five virtual tracks, and synthLab lets advanced students do sophisticated sound design. TamTam activities share the same software, but each activity uses only the necessary features and functions.

Intrigued? Try it yourself. The Sugar LiveCD, when available, is easy to use. Don't worry about drivers: My 1997 Sony Vaio laptop worked great, including sound drivers!

Sugar's features make the XO an ideal learning appliance for children, but I hope we'll see it extended for adult use. If it can foster group learning among children, I'll bet it could foster teamwork among adults.

You might not be able to buy an XO, but you can still get similarly tiny and almost as inexpensive Linux laptops, such as the Asus Eee PC and the Everex CloudBook. Next month, I'll examine the Linux distros Asus and Everex have chosen for their UMPCs. ▲

You can get saucy with Pete at pete@cpumag.com.

Tiered 'Net Access

Broadband By The Byte

Veterans of online services will remember the old "electronic BBS" days when subscribers to proprietary information systems often paid by the minute. In the early years of dial-up access to the Internet and closed data services, many users paid hourly rates. Every download came with a calculation. Was that extra hour of connection through our pokey 2400-baud modem worth nabbing the latest copy of Commander Keen or grainy wallpaper of the "Star Trek" crew? With the arrival of broadband services in the mid- to late-90s, however, pricing and bandwidth opened up considerably. ISPs often lured us into upgrading by promising a new model of all-you-can-eat, always-on, unlimited usage that forsook long distance rates and overage charges. With fees as high as $50 to $60 a month, even unlimited access never could be mistaken for a free lunch. But there are signs that the *prix fixe* buffet of the last decade may be coming to an end.

Test The Meter

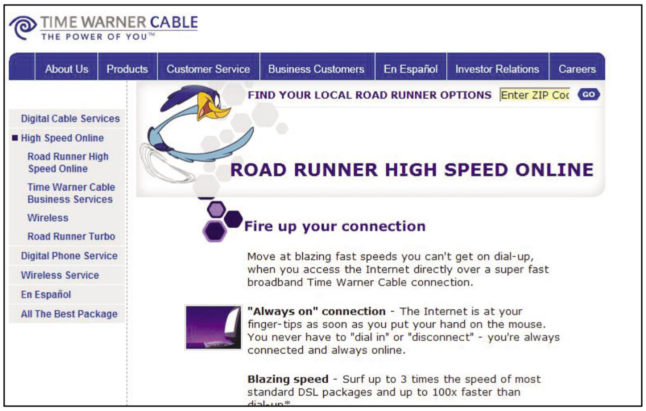
Starting sometime this year, Time Warner Cable will begin testing a metered system that the company calls "Consumption Based Billing" in Beaumont, Texas. While TWC would not respond directly to *CPU* about the details of the plan, BroadbandReports.com obtained an internal memo in January that outlined the company's intentions broadly. In an effort to retrieve more revenue from what TWC executives called the "5% of subscribers who utilize over half of the total network bandwidth," new subscribers will opt into one of several tiers. A TWC spokesperson did confirm to *The New York Times* that the proposed tiers would cap monthly data downloads at 5GB, 10GB, 20GB or 40GBs respectively and that users would be charged for overages. "It is kind of like a cell phone plan," TWC spokesperson Alex Dudley told Multi-Channel News.

"I think it's just a marketing test," says Karl Bode, editor, BroadbandReport.com, who broke the story with the memo. "They are going to sample it with new customers to see how they will respond." In fact, the proposed test, which is scheduled to start sometime in the second quarter of 2008, will only apply to new customers, who will then monitor the status of their monthly usage on personal accounts pages. TWC will invite them to upgrade to plans with higher caps if they tend to incur overage charges each month. No pricing for the tiers or overages have been announced. The Beaumont Time Warner market serves 90,000 customers in 15 towns, charging $44.95 a month for unlimited Internet access to existing cable TV customers and $54.95 to ISP-only customers.

And while Time Warner was the ISP with specific testing plans that got exposed in the press, the company is not alone in contemplating a return to usage-based pricing. "I think Comcast has internally tested it," says Bode. He surveyed about a half dozen ISPs, including Qwest, AT&T, and Cablevision, all of whom told him they had no plans to change their unlimited models. But some smaller providers such as Sonic.net and Speakeasy admit that they have contemplated metered usage alternatives and ultimately rejected them. One Comcast insider told consumer watchdog The Consumerist.com that the ISP already had a system ready to roll that would pop up a warning to its customers when they exceeded a set monthly limit and offer to sell additional gigabytes of downloads. According to the former Comcast employee who served as the source, Comcast was waiting for other ISPs to deploy usage limits and overage charges before risking a user backlash themselves.

Bandwidth Hogs

While American broadband users have a decade-long habit of unlimited access and flat pricing, on a global basis metered usage is not extraordinary. "Australia has had tiered levels of broadband based on usage forever," says eMarketer analyst Ben Macklin, who also lives down under. "Most providers give you 30GB per month with ADSL2+ speeds at about $50 to $60 per month. Usage charges used to be a



Move at blazing fast speeds you can't get on dial-up, when you access the Internet directly over a super fast broadband Time Warner Cable connection.

"Always on" connection - The Internet is at your finger-tips as soon as you put your hand on the mouse. You never have to "dial in" or "disconnect" - you're always connected and always online.

Blazing speed - Surf up to 3 times the speed of most standard DSL packages and up to 100x faster than

Time Warner's Road Runner cable broadband service will experiment with tiered, metered bandwidth plans in Beaumont, Tex., later this year.

problem in Australia, but 30GB is a truckload for most people." Alternatively, Canadian ISP Rogers uses a system of capping, whereby users pay a flat rate until they exceed a limit that can range from 10 to 75GB a month. Bode thinks that Australia's metered billing "is fairly ridiculous" and Canada "is bad with its overage charges," especially since tracking individual usage reliably is proving difficult. According to Bode, satellite ISPs such as WildBlue and HughesNet often reduce throughput on heavy users in order to manage their more bandwidth-challenged technology. "Satellite broadband is pretty bad with caps, and they throttle back pretty tightly after users max out. But they also get some of the worst reviews," he adds.

Indeed, U.S. ISPs have been slow and very secretive about metered and tiered plans because they fear consumer wrath. Why, then, would they even consider shocking the consumers with a return to tiered pricing after a decade of selling unlimited plans at such a profit? Time Warner's internal research shows that about 5% of heavy peer-to-peer file sharers and other major file downloaders are responsible for up to half of the bandwidth usage, and this test is an attempt to make such excessive users pay extra. "This is not targeted at people who download movies from Apple," TWC's Dudley told *The New York Times*. "This is aimed at people who use peer-to-peer networks and download terabytes."

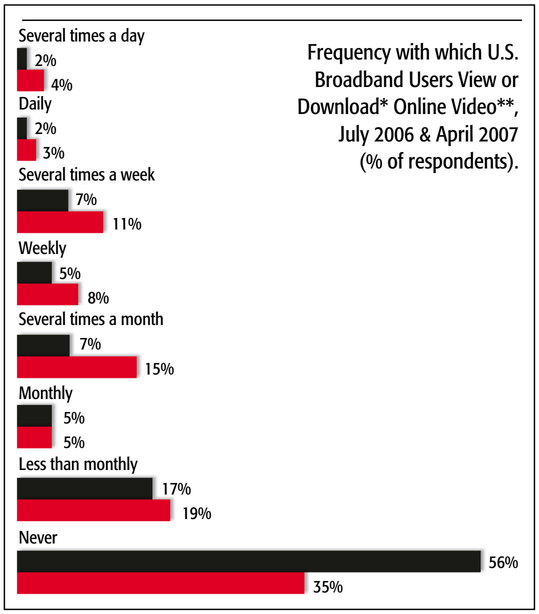
Well, maybe, counters Bode. The ISPs "are terrified of a broadband video future," he says. By some estimates, overall Internet usage is increasing by 50% a year, in large part because video streams from sites such as YouTube, MySpace, NBC, and Break.com have become a part of everyone's daily online rituals. On cable networks especially, where people in neighborhoods share a node, a single bandwidth hog can diminish the experience for everyone and affect an ISP's relationship with all customers. But more than the strain on bandwidth, even more frightening to the cable providers is the fact that online usage now competes directly with the largest part of their business. "Their TV service doesn't make as much sense if people can get it through broadband," says Bode. "They have a flood of competitors on the content front, so they are starting to consider their options." If advertising dollars and users continue to move from TV, the bread and butter of cable providers, to digital, where flat pricing reigns, then the cable companies want other ways to cash in.

Pay As You Go

If indeed an infrastructure is being built mainly to benefit a small share of heavy downloaders, then why shouldn't this minority carry more of the cost? As people begin to download full feature films online and as high-definition video broadcasts start filling the backbone, some in the industry feel that some kind of usage-based pricing is inevitable. Most of the unlimited pricing plans were created in the Web 1.0 era when developers only dreamt of one day using the Internet as a thoroughfare for telephone services, video transfers, and even IPTV. The situation has changed, and for Macklin, the principle of metered billing is sound. "In general, paying for what you use is a very fair system," he says. "I don't think it is the end of the world as we know it, as some bloggers suggest." Some within the industry are speaking as if the shift to new models is an inevitable part of the increased demands on ISP technology. At the industry's CableNEXT conference in late 2007, the Chief Technology Officer of Charter Communications,

The Utility Model

For years, Internet prophets argued that, like electricity, water, heat, and sewer service, broadband ultimately would be treated like another utility. So why shouldn't we pay for Internet access in the same metered fashion we pay for power and heat, long distance phone calls, and gas? After all, big families use more water, power, and heat than small ones, and they don't pay flat fees by the household. As eMarketer's Ben Macklin argues (see the main body of this article), why shouldn't heavy users and multi-user homes simply pay for the bandwidth they use? The counter-argument, posed by policy experts such as Free Press's Ben Scott, is that the Internet is not a utility in the same sense as gas and water. It is an emerging media platform that has improved because of investment by third parties such as Web publishers and TV networks into new uses of the Internet. Consumers are willing to try these new resources, such as video Web 2.0 applications and digital music and film distribution, in part because they don't have to concern themselves with how much bandwidth these services require. Whether the ISPs do enact capping, overage fees, or metering, it seems likely that in order to keep the digital ecosystem robust, the providers of this new "utility" will need to keep pricing low enough to encourage experimentation and innovation. ▲



According to eMarketer, the amount of bandwidth used by U.S. consumers can vary widely from person to person.

Marwan Fawaz was blunt. "Eventually, we will go to a usage-based solution."

Many others in the industry believe that metered access will be hard to explain to consumers, and it may inhibit Internet innovation. "When you meter pricing in broadband, you are discouraging people from using high-bandwidth applications," says Ben Scott, the policy director at media watchdog group Free Press. ISPs are already setting the stage for changing models, he says, by complaining they are running out of network capacity. In an ongoing case, Comcast is being investigated by the FCC and New York Attorney General's office for "throttling back" speeds on bandwidth-demanding peer-to-peer applications. Because cable ISPs use an architecture that shares bandwidth in neighborhoods, they are the ones exploring metered pricing, he says. But it is unclear whether a metered plan is just being used as a way for them not to build more infrastructure. "Are we talking about just charging high-bandwidth users or are they willing to lower pricing for low-bandwidth users?" he asks.

The Limits Of "Unlimited"

But, as Scott also points out, in some respects metered access and usage limits are already in place in the U.S. market; they just tend to be invisible to most users. When it comes to wireless broadband cards and even wireless data packages for cell phones, consumers often do still buy by the megabyte. Sprint Mobile Broadband has a $39.99/40MB a month plan in addition to its more expensive "Unlimited" plan. Starting in March, Verizon Wireless instituted a 5GB cap on its "Unlimited" mobile broadband plan, now charging $.49 for every megabyte used over that cap. But the ISP industry has been rife with reports and insider revelations about "soft caps" that already exist at most ISPs. Many ISPs will warn extremely heavy-bandwidth users that they are exceeding the reasonable limits of the service. According to reports, some of these heavy users find their accounts canceled or see some types of traffic, especially peer-to-peer file sharing, throttled back. Some providers maintain "fair usage" provisions in their contracts with customers that reserve this right of cancellation even on "unlimited" accounts.

For now, account cancellations and throttling seem to affect only a small fraction of users, but America's online video addiction may make bandwidth hogs of us all. In addition to the meteoric rise in YouTube visits in the past few years, just this winter online video rentals started kicking into the system. Apple, Amazon, and others introduced direct downloading of rented films with file sizes that start at 1GB and can reach 4GB for some of the HD versions If an Apple TV owner rents just five or six high-def flicks in the course of the month, he will already approach the 40GB top level tier Time Warner is proposing for its Beaumont test.

The biggest barrier against tiered pricing is that no ISP wants to be the first to seem stingy about bandwidth and enforce highly visible metered pricing. "Providers are terrified of consumer backlash," says Bode. After years of flat-priced, unlimited access, it seems unlikely that the U.S. market will turn to strictly metered models. The more likely prospect may be transparent capping, where extremely heavy users will pay overage charges for exceeding an openly defined maximum. These users could be offered a mega-user tier, where they pay more than a standard account for both faster and truly unlimited bandwidth.

But even with the substantial increases in bandwidth consumption, it remains an open question whether ISPs, the cable industry in particular, need a pricing remedy when a technical fix is in the wings. The upcoming upgrade of many cable systems to the DOCSIS 3.0 (Data Over Cable Interface Specification) protocol should nearly triple both upstream and downstream bandwidth available over the current DOCSIS 2.0 standard. And while controversial among some users, traffic shaping, bandwidth throttling, load management, etc., are all techniques that ISPs can use to make their networks more efficient, short of charging users by the byte.

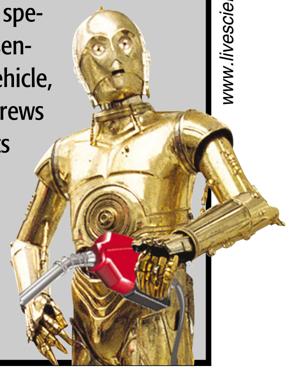
Other ISPs will be watching Beaumont, Texas, closely to see whether the users push back on the model or come to accept it. The upcoming trial of Time Warner's metered model is as much a test of consumers as it is of technology. ▲

by Steve Smith

Infinite Loop

C3PO, Stand Aside

The next time you pull in for a fill-up in Emmeloord, The Netherlands, don't be too surprised if the service station employee bears a greater resemblance to R2D2 than the Man with the Star. Robots are now dispensing gasoline with the precision of seasoned attendants. A special arm fitted with sensors identifies the vehicle, opens the flap, unscrews the gas cap, and puts the nozzle in the tank. Now if someone can just teach it how to make change.



www.livescience.com/technology/080206-blue-collar.html

The Department Of Stuff

by Rob “CmdrTaco” Malda

anonymous.txt

Anonymity and the Internet have always have been a pair of inseparable buddies. Not necessarily because anyone planned it that way, but because the system grew faster than anyone expected. This has had a variety of repercussions, both good and bad. And I wonder how much longer it will last.

This came to mind recently because of a new site called WikiLeaks. As the not-so-subtle name implies, the site uses wiki-style open and anonymous editing, but with a specific intent to leak documents that might face resistance from someone. The sort of freedom of speech stuff critical to maintaining a check against the ruling powers.

There’s a long history of anonymous sources, of course, from Deep Throat and beyond, but never before have those sources been able to be placed so simply into the public domain. Historically this is part of the role of journalism, but just like blogging has changed the game, now we’re seeing the research part of the game change, as well.

The Internet’s mantra of “Information Wants to Be Free” is more than just a theory. Countless Web sites exist to relay traffic from one IP to another. Certainly much of this traffic is used for nefarious purposes, but that doesn’t squelch the important legitimacy of other purposes. Likewise, the automated peer-to-peer proxy network Tor takes this to an extreme.

At my day job, someone uses Tor to spam our Web site. It’s depressing having to code up security protections against something that you know is philosophically good. We had to prevent people from posting anonymously from Tor; if you want to post, you must create an account. Of course, there’s no uniqueness in email addresses. Recently, hackers have successfully automated the defeat of Gmail’s captcha, allowing hordes of new email addresses to leak out.

In the days of the printing press, anyone could print their words and share them with the masses while remaining anonymous. These days, that’s not even possible anymore. Most modern printers ship with the ability to print codes invisible to the naked eye, embedded on every page, that make it possible to tie the printer to the page after the fact. But on the Internet, people still can be at least sort of anonymous. For now.

Corporate interests have been trying for the last decade to untangle the “mess” of anonymous Internet access. They’ve tried going after ISPs and colleges to protect their digital property rights. They’ve ef-fectively hacked the government to get laws passed that lets them use our law enforcement to do their work for them. I respect their desire to cash in on their content, but along the way their actions are leaving a wake of destruction in the freedom of the Internet.

There is a powerful parallel to this in the form of spam. Each time system administrators squeezed harder, the spammers got more creative. Now spam is distributed via sophisticated networks of worms that exploit unpatched Windows machines, harnessing them into powerful botnets that will inevitably be used for something more evil than spam. Our desire to not be bugged about Viagra has resulted in the creation of a computing superpower that will one day be used by terrorists to cripple our lives. Every day we grow more dependent on the Internet. Who knows what will happen when this system is harnessed by someone with knowledge, vision, and motivation?

And you can bet that the criminals will be able to do it anonymously. If there’s one thing we’ve learned from the war on spam, it’s that “they” always have the upper hand. They are more motivated than we are and have the infinite hours of the passionately devoted. From griefing MMOs to spreading the now infamous ‘Goatse’ graphic to spam and beyond . . . anonymity and the Internet may be inseparable, and the practice of trying to separate them may escalate into an arms race we don’t want to see. ▲

Contact me at malda@cpumag.com

Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the ’Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

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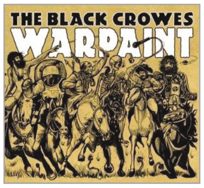
At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for the most part) love and recommend, read on.

Audio Video Corner

by Blaine A. Flamig



$15.98
Silver Arrow Records
www.blackcrowes.com

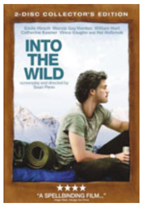
The Black Crowes—Warpaint

We're old enough to remember when The Black Crowes mattered to a lot more people than they do today. The band's parting of ways in 2001 by at-odds brothers Chris and Rich Robinson will do that, as will lackluster efforts such as that year's plodding "Lions." Riding a strong Allman Brothers vibe, the Crowes are thankfully squawking again with "Warpaint," sounding renewed and full of life in these tracks ringing of gospel, blues, and southern rock. Luther Dickinson of North Mississippi All-Stars deserves major kudos for his guitar additions throughout, but stalwart tracks such as the sultry opener "Daughters Of The Revolution," "Oh Josephine," and the glorious cover of Rev. Charlie Jackson's "God's Got It" do as much to make "Warpaint" matter. ▲

$16.98
Side One Dummy Records
www.floggingmolly.com

Flogging Molly—Float

With St. Patrick's Day fast upon us as we head to press, it's only fitting to pay respect to seven-member Irish punk outfit Flogging Molly and its magically delicious "Float." Influenced by a childhood walking Dublin's streets and adult years weathered in LA's punk scene, main songwriter/singer Dave King crafts songs thick with traditional Irish folk foundations dripping with frenzied globs of punk chaos. On "Float," Flogging Molly is more refined, mature, and locked in than on anything it has done on its previous five or so re-cords. On "Requiem For A Dying Song," "Punch Drunk Grinning Soul," and "Between A Man And A Woman," the band manages to transfer the frenzied fever and intimateness of its renowned live shows to record, making for one joyous celebration. ▲



$29.98
Paramount Pictures
www.intothewild.com

Into The Wild

Whatever your feelings are concerning Sean Penn's politics, they shouldn't deter you from reveling in his directing abilities. Penn's specialty is instilling his films with a visual atmosphere that feels soft and inviting but is contrasted with the emotional baggage his films' protagonists are saddled with, such as sharply conflicted, yet loving, brothers Viggo Mortensen and David Morse in 1991's "Indian Runner" and Jack Nicholson as a retired sheriff obsessed with finding a child's killer in 2001's "The Pledge." In "Into The Wild," a true story adapted from Jon Krakauer's book, Emile Hirsch is Christopher McCandless, a disillusioned Emory University grad who abandons modern trappings to live in Alaska's wild. Inspiring, sorrowful, and hopeful, "Into The Wild" continues Penn's streak as one of America's most interesting directors. ▲

$29.98
Dreamworks Pictures
www.thingswelostinthefire.com

Things We Lost In The Fire

If you skipped "Things We Lost In The Fire" because the film had all the appearances of being a stereotypical tearjerker, you were wrong, as were we. Plotlines that could have easily been clichés are instead engaging twists and turns covered with grit and grime. If that doesn't convince you "Fire" is worth your time, isn't any movie with actor's actor Benicio Del Toro worth a viewing? Del Toro is incredibly absorbing here as Jerry, a drug addict who turns up at best friend Brian's (a wonderful David Duchovny) funeral, despite knowing Brian's widow Audrey (Halle Berry) holds great disdain for him. An effective examination on loneliness and how it can scorch us, "Things We Lost In The Fire" is anything but typical schmaltzy filmmaking. ▲

See the full reviews from A/V Corner at www.cpumag.com/cpumay08/AYL

DVD Byte

4/8

Lions For Lambs

Resurrecting The Champ

There Will Be Blood

Walk Hard: The Dewey Cox Story

4/15

Aliens Vs. Predator: Requiem

Before The Devil Knows You're Dead

Juno

Lars And The Real Girl

4/22

Charlie Wilson's War

The Savages

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The Diving Bell And The Butterfly

The Golden Compass

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by Dr. Malaprop

$39.99 (PC) • ESRB: (T)een

Stardock • www.sinsofasolarempire.com

The game's title evokes great imagery, so it's kudos to developer Ironclad Games for not only penning a great name but creating a game that keeps you from getting a good night's sleep. Sins can be described as a hybrid experience that melds 4X (Explore, Expand, Exploit, and Exterminate) turn-based and RTS gameplay. As an example, that would be like mixing together recipes that made up Galactic Civilizations and Homeworld into a tasty hot pot. (Lest the term 4X is unfamiliar, Sid Meier's Civilization series qualifies.) There's not much story to speak of besides the introductory cinematics, where we learn of three factions locked in deadly battle: the human Trader's Emergency Coalition (a human alliance of worlds hell-bent on its capitalist ways), Vasari (a once-great alien race fleeing from a self-created nemesis), and the Advent (humans once exiled thousands of years ago for their alien philosophy returning with an agenda). Each faction is balanced and requires a different strategy to succeed.

As the game begins, you'll have the option for a tutorial, sandbox solo play, and multiplayer. We recommend stepping through the tutorial (a PDF manual is included). It may be easy to initially feel overwhelmed by a game whose scope is conquering entire galaxies, but you should be quite comfortable with the concepts needed to have fun a couple of hours in. The overall 3D graphical look is attractive but not cutting edge. You start with control of a single planet and some ships. As is common with 4X games, you begin exploring and expand your influence, working to exploit other races (for example, allying with one race but paying another to attack and exterminate that ally), which lets you get downright devious in multiplayer.

Unlike the typical turn-based 4X game, Sins plays out in slow real time at a pace that's completely dissimilar to titles such as Supreme Commander or Company of Heroes. A small map can be played through in a couple of hours, a mid-size map in a day, and the largest maps longer than an entire weekend (especially in multiplayer). That's a pro and a con. Fortunately, you can save multiplayer games and resume when ready to continue, which makes it work.

As you scale up to large games, you'll find a couple of key features that make a seemingly complex hodgepodge of micromanagement a nonissue. The first is a macro tree (the Empire menu) that provides players with a one-stop view for tracking your galaxies and resources along the left side of the screen. Another interface feature is the massive scale of the in-game zoom, from spaceship or multiship view to multiplanet to multistar system. We saw and liked this zoom capability in 2007's Supreme Commander, but that feature becomes ever more effective in Sins. However, we would have liked to have had this option implemented on a second screen, as it was in Supreme Commander.

Sins of a Solar Empire exceeded our expectations and fully lives up to its hype. The biggest caveat is its lack of a single player campaign. Not having a campaign is an omission that will be missed by many gamers that thrive on structure or prefer single-player to multiplayer. We'd definitely like to see a campaign add-on down the road. Sins is a must-buy for strategy lovers. Furthermore, the friendly $39.99 entry cost is small compared to the ridiculous hours of addictive entertainment you'll have through the summer. Expect to lose a lot of sleep as you take "just one more turn." ▲

LOST ODYSSEY

Back To Basics-*by Dr. Malaprop*

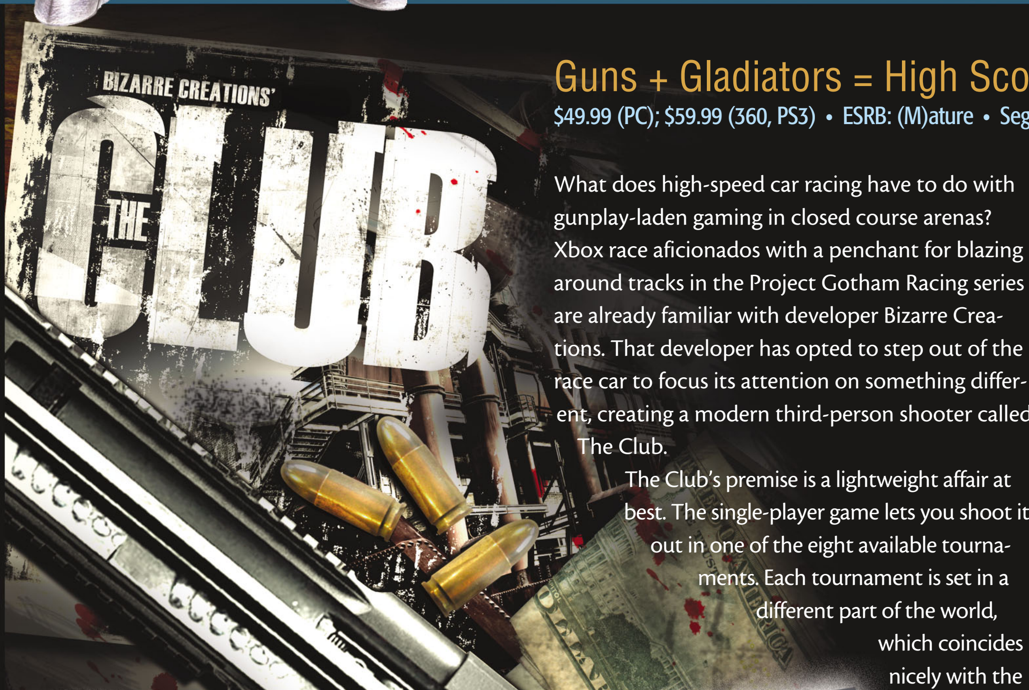
$59.99 (360) • ESRB: (T)een • Microsoft • www.xbox.com/lostodyssey

Final Fantasy has long been the realm of the PlayStation, and having a Final Fantasy-esque title exclusively available on the Xbox 360 is quite an event. Hironobu Sakaguchi's Lost Odyssey starts with a giant battle. As the enemy closes in, a catastrophic event devours everyone. Only a handful survive; Kaim is one of them.

Kaim is a 1,000-year-old immortal without any memory of his past. As you gather up a party of additional characters (mortals and immortals) and head out on the main storyline quest, you discover that Kaim's amnesia is shared by other immortals in your party. Events and discoveries in the game unlock a memory. These memories unfold through well-written, occasionally overdramatic prose that creates an emotional connection with your party of characters.

The tried-and-true conventions of the genre remain, but there are some evolutionary additions that improve gameplay. For instance, during physical combat you have the ability to inflict more damage by timing the first hit as your character charges an enemy, improve combat effectiveness by creating custom rings, and have party members in the rear of a formation better protected from initial attacks. You'll also mull over strategies to combine the various skills of your party to win the big boss battles.

Lost Odyssey spans four DVDs and features attractive UnrealEngine3 graphics. Random combat encounters are well-spaced. Less pleasing were the load times between map sections and before combat. Those load times add up to many wasted minutes. Some cut-scenes ramble, and more editing would have helped. However, anyone familiar with classic Japanese-style RPGs is going to comfortably settle into Lost Odyssey, and it's the best you're going to find on the 360 today. ▲



Guns + Gladiators = High Score-*by Dr. Malaprop*

$49.99 (PC); $59.99 (360, PS3) • ESRB: (M)ature • Sega • www.sega.com/theclub

What does high-speed car racing have to do with gunplay-laden gaming in closed course arenas? Xbox race aficionados with a penchant for blazing around tracks in the Project Gotham Racing series are already familiar with developer Bizarre Creations. That developer has opted to step out of the race car to focus its attention on something different, creating a modern third-person shooter called The Club.

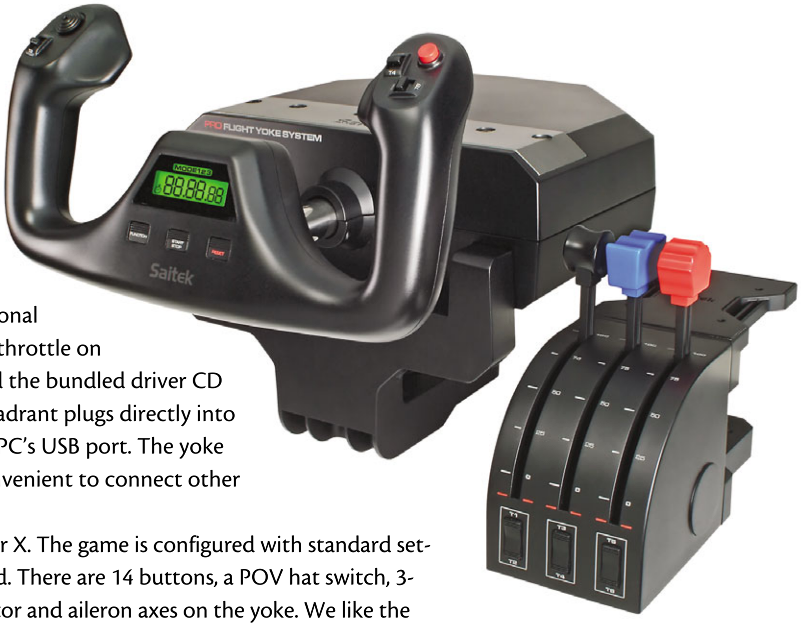
The Club's premise is a lightweight affair at best. The single-player game lets you shoot it out in one of the eight available tournaments. Each tournament is set in a different part of the world, which coincides nicely with the fact that you can play as one of eight thuggish gunmen (no women here). The characters look different but play and handle similarly, which is a missed opportunity for adding more depth to the gameplay.

Shoot and grenade your way through each closed course while taking down enemies as efficiently as possible on your way to the exit. It's not so much about just killing enemy characters, but using style for points and maintaining your timed combo bonus to boost your score. High score is the name of the game, and you have a limited time on each course to gain those points.

You'll likely finish the game in less than four hours. There are a few game modes along with online multiplayer (Games For Windows Live and LAN on the PC), but you'll really only be replaying to get higher scores. The PC version of the game looks better but is a straight 360 port. We also had an easier time finding multiplayer opponents on Xbox Live. Shooter fans wanting depth should look elsewhere, but arcade gamers will enjoy The Club's repetitive old-school nature where you memorize enemy locations to improve those combo points. ▲

Pro Flight Yoke System

Take To The Skies *-by Dr. Malaprop*



Several months ago, we reviewed Saitek's X52 Pro Flight Control System and, later, the Pro Flight Rudder Pedals. As you may recall, we liked both. It's time to complete our round-up of Saitek products for PC flight simulator enthusiasts.

As you can see from the photos, this package includes not only a flight yoke but also the Pro Flight Throttle Quadrant. Additional quadrants may be purchased for $59.95 if you want to control the throttle on multi-engine planes. The kit is easy to clamp securely on a desk and the bundled driver CD preps Windows for your in-flight experience. We liked that the Quadrant plugs directly into the yoke via a proprietary connector and the yoke plugs into your PC's USB port. The yoke itself is designed with a three-port USB 2.0 hub, which makes it convenient to connect other desktop peripherals.

Naturally, our primary test subject was Microsoft Flight Simulator X. The game is configured with standard settings for Flight Simulator X but can reconfigure the devices if desired. There are 14 buttons, a POV hat switch, 3-position Mode Switch, three axis levers on the Quadrant, and elevator and aileron axes on the yoke. We like the yoke's stainless steel shaft, which moved smoothly for elevator and aileron control. The shaft has a great sliding motion that definitely improves the realism factor of the flight experience.

It's hard to miss the green, backlit display in the center of the yoke. It displays time and a stopwatch for instrument-only flight. The Quadrant has three levers which by default are throttle, propeller control, and mixture along with three rocker switches along the bottom of the throttle controls. However, you can reconfigure the levers (and add more) based on your flight requirements. If you're looking for great quality and well-controlled peripherals to enhance your Desktop flight sim experience, you'd be hard pressed to do better than Saitek's offerings for the price. ▲

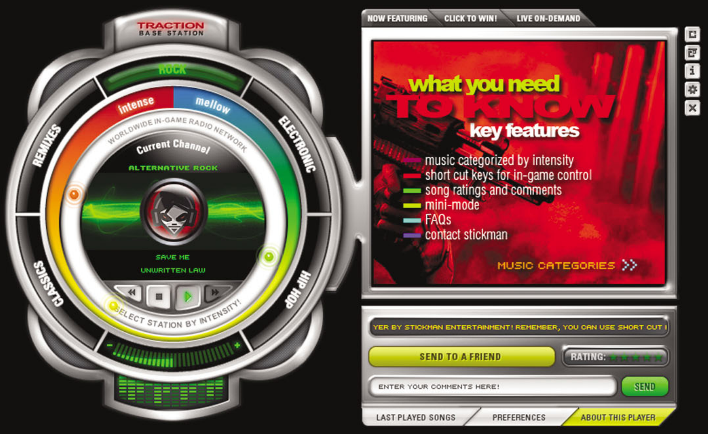
$149.95 (PC) I Saitek
saitekusa.com/usa/prod/yoke.htm
CPU Rating: ●●●●◖

Tractionradio.com beta v1.0

Internet Radio Not Slacking For Gamers *-by Dr. Malaprop*

Free (PC) I Stickman Entertainment
www.tractionradio.com
CPU Rating: ●●◖

Gamers, there's a new Internet radio option available just for you. A beta version of the Traction Radio Base Station player is available as a free download at Tractionradio.com. One of the key features of the player is its small system resource footprint, which works out nicely for PC gaming. Unlike most Internet Radio players (think Slacker), where the gamer would need to ALT-TAB out of the game to switch stations, genres, rate a song, change the player volume, and so forth, Traction Radio lets you manipulate the player from within the game. You can use hot keys to adjust volume, genres, music intensity, enter song ratings, and even enter contests. The genre options are Rock, Electronic, Hip-Hop, Classic (Rock), and Remixes. Each genre has a Mellow to Intense range that can be selected on the internal circular interface, although we found this somewhat unintuitive.



what you need
TO KNOW
key features
- music categorized by intensity
- short cut keys for in-game control
- song ratings and comments
- mini-mode
- FAQs
- contact stickman

YER BY STICKMAN ENTERTAINMENT! REMEMBER, YOU CAN USE SHORT CUT I

For our test, we ran Sins Of A Solar Empire for an eight-hour gaming session on an old Athlon X2 4800+-based system using 2GB of RAM, a GeForce 7800GTX, and Windows XP. We played the game in full-screen 1920 X 1200 and swapped down to a windowed mode then back again without the radio station stuttering or crashing. More interestingly, we didn't need to touch the radio player app itself to change stations or music intensity for the entire duration. We had a similar experience when playing World in Conflict at the same full-screen resolution. Things got less responsive when we erroneously jumped into World in Conflict with Sins Of A Solar Empire running simultaneously in the background, but the radio player continued uninterrupted.

The music selection doesn't feel as personal as it does with Slacker, and the voice prompts only note intensity without announcing which genre of music you're switching to in-game. Of course, this product is still in beta and, as such, is likely to get better with time, so we plan to keep an eye on it. ▲

by Barry Brenesal

The First Hard Drive

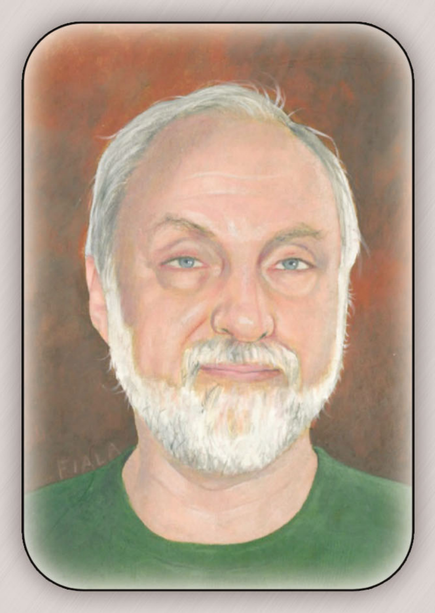
The other day, I pulled a hard drive from a couple of years ago out of storage, connected it to a USB port, and transferred some data. This led me to reflect on how such a recent, remarkable development as the hard drive has turned into a casual accessory of computer life. This isn't surprising. We accept all the cultural toys of today, assuming they were always part of our surroundings and will always be there. This attitude informs our approach to everything from speech to fashion to history of our own government—and to the hard drive.

But the past isn't the present with a layer of antique brass paint. Many things were done differently, and for different reasons. Others had their beginnings in a form we would barely recognize today.

Consider, for example, that first hard drive, introduced by IBM in 1956. It was known as the RAMAC 305; RAMAC stood for Random Access Method of Accounting and Control. (Self-important acronyms were big in those days, too; some things never go out of style.) Weighing in stripped at roughly a ton, it cost $50,000 a year to rent. Jim Porter worked in San Francisco for Crown Zellerbach, a paper manufacturing firm that received one of the first units. He recalled years later that, "It was about the size of two large refrigerators, about as tall as a person stands. . . . Any time we had a business guest, they wanted to see it, so I'd take them three levels below Market Street to see the computer room. It put on a good show."

If it was a circus show, then the 305 was likely the elephant act, where sheer size triumphs. RAMAC possessed 50 spinning platters, each 24 inches in diameter—or about twice as large across as a contemporary phonograph record. According to IBM's own PR materials of the time, "these disks are mounted so as to rotate about a vertical axis, with a spacing of 3/10 inches between disks. This spacing permits two magnetic heads to be positioned to any one of the 100 concentric tracks which are available on each side of each disk. . . . The two recording heads are mounted in a pair of arms which are moved, by a feedback control system, in a radial direction to straddle a selected disk." (The heads were relatively quiet, but the air compressor used solely to cleanse them of dust and grit was pretty noisy.)

Together, they could store up to 5MB of data, for an areal density of about 2,000 decimal bits. As a yardstick for comparison, Hitachi claimed a couple of years ago that it had achieved an areal density of 345GB, or 345,000,000,000 decimal bits. Its 1TB drive, the 7K1000, appeared last year.



Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

But in contemporary terms, RAMAC was an amazing development. Until that time, state-of-the-art mainframes suffered from tediously lengthy, mechanically managed data retrieval. Remember the scenes from films of the 1950s and 1960s showing enormous computers with ever-revolving punch tape reels, serviced by an efficient, unemotional white-shirt-and-tie staff? No? Get away from me, kid. For the rest of us, all those dizzily running, stopping, and reversing reels were a moderately realistic depiction of contemporary computers finding and loading in data. There were some methods of cueing these tapes, such as tone placement, paper leads, and analog measurement. But the RAMAC was the first storage device that could retrieve electronically-coded information quickly, in a recognizably modern computer setting.

Porter later commented, "My understanding, although I cannot document it, is that the very first disk drive is now in the Smithsonian, as an industrial historic relic. The trouble is the Smithsonian buys these things, puts them in a warehouse, and brings them out 100 years later." A fun quote, but incorrect, at least in this instance. One of those early RAMAC 305s is currently on display at the Computer History Museum in Mountain View, Calif., where it shares a building alongside such other artifacts as a GPS Analog Computer, a Zuse Z3 Adder, and the one-and-only ENIAC, on loan from the Smithsonian. I imagine the binary exchanges of boasts and recollections get quite interesting on those long, cool spring nights. ▲

Wax nostalgic with Barry at
barry@cpumag.com

ALL NEW!

POWER MOD

SERIES

"For Serious Modders"

NVIDIA SLI™ READY

MODULAR CABLE MANAGEMENT

CPU Magazine's
"Computer Mod Winner"
PDX LAN 11 | powered by *FSP*

Tandy TRS-80

700W | 600W

- 3-Year Warranty
- Advanced ATX 2.2 | EPS 2.91
- Supports The Latest Multi-Core AMD | INTEL CPUs
- Active PFC | Standby 1-Watt Energy Saver
- 120mm Variable-Speed Ball-Bearing Cooling Fan
- Stable-Power QUAD 12V Rail-Design
- 80%+ Operating Efficiency
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Software Tips & Projects

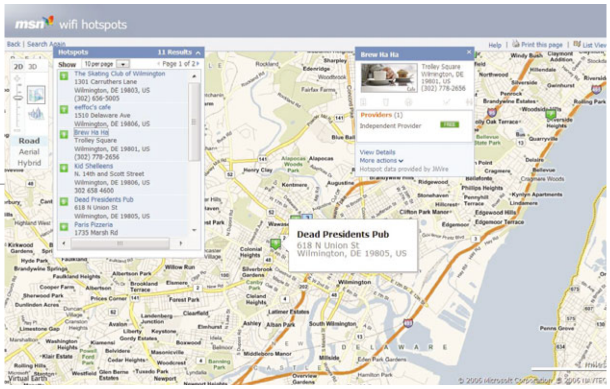
Finding The No-Toll Roads

Managing one cluttered PC is hard enough, but managing a main home PC and a remote office PC or laptop can be maddening . . . even expensive. As we travel the country, finding good and free Web services that keep us productive on the road has become a bit of a sport. Even after you get beyond the usual suspects, Gmail, Flickr, and del.icio.us, there are loads of free services that seem designed for road warriors who need to stay in contact with another computer or maintain services from any computer. We take a break this month from our ongoing digital imaging projects to take a road trip, for free, and explore tools and tips for easier PC travel.

Wi-Fi On The Cheap

What if you're stuck in a hotel room that wants to gouge you $12.99 per night to access Wi-Fi? Look for the free alternatives in the area. One of the best Wi-Fi locator services we've seen comes from a familiar brand, Microsoft. At MSN WiFi Hotspots (hotspot.msn.com), you get a very robust mapped directory of hotspots throughout the world. We even found listings in Spain and Vietnam. At the start page, just enter the region or ZIP code and the area of coverage you want to search and click the Free radio button. MSN gives you a mapped version of the results with pop-ups, links to directions, etc. Of course, this is the kind of thing you want to do before you get to your destination, since, after all, you're looking for a hotspot so you can get a Web connection in the first place.

If you do find yourself stuck without a Wi-Fi connection with no way to discover one online, flip open your cell phone and open the WAP browser. Try going to m.yahoo.com and entering **wi-fi** [**ZIP code**] in the oneSearch box and you should find local businesses with some wireless connections, as well as direct-dial links to discover if they are free. An alternative is to use a free SMS search service. 4Info lets you text "wi-fi [ZIP code]" to 44636 and sends two nearby hotspots with a designation of "free" or "pay" for each. While the service is free, keep in mind that, as they say, all of your usual carrier's messaging charges apply.



The Skating Club of Wilmington
1301 Carruthers Lane
Wilmington, DE 19803, US
(302) 656-5005

eeffoc's cafe
1510 Delaware Ave
Wilmington, DE 19806, US

Brew Ha Ha
Trolley Square
Wilmington, DE 19801, US
(302) 778-2656

Kid Shelleens
N. 14th and Scott Street
Wilmington, DE 19806, US
302 658 4600

Dead Presidents Pub
618 N Union St
Wilmington, DE 19805, US

Paris Pizzeria
1735 Marsh Rd

Dead Presidents Pub
618 N Union St
Wilmington, DE 19805, US

If you're looking for both free and pay Wi-Fi hotspots, the MSN hotspot directory offers among the most up-to-date listings for worldwide access.

Remote Access On The Cheap

We've been traveling this great world for years, and again and again, the most useful piece of travel software we use gives us remote access to our home PC. Having direct access to your own Desktop from any PC via the Web is one of the greatest productivity tools available. Ordinarily, the service costs $12 or more per month from most vendors. But for our money, or lack thereof, LogMeIn Free (www.logmein.com) is indispensable. Of course, you need to download and install the LogMeIn client on your host PC, and your PC at home must be on at all times for remote access to work.

On the remote PC, all you need to do is log in to LogMeIn.com using your

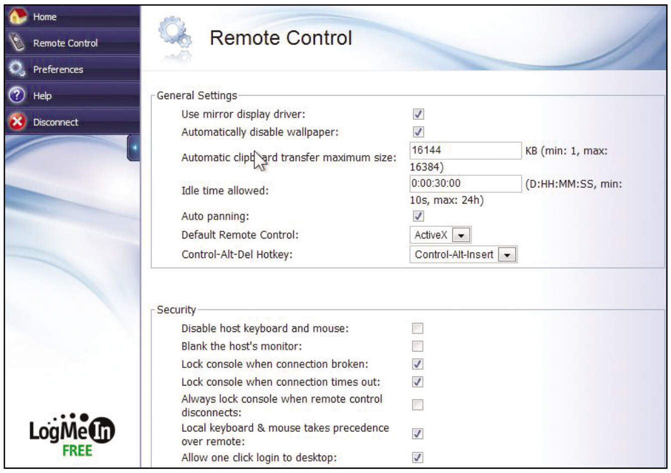
Windows Tip Of The Month

There are a lot of mouse tricks one can use in Mozilla's Firefox browser, although even some of the most advanced users of the alternative browser are unaware of them. For instance, pressing the SHIFT key along with the mouse wheel SCROLL DOWN is a shortcut to the Back command, while the SHIFT-SCROLL UP combination is Forward. If your scroll wheel's click action is configured as the Middle mouse button, then using the wheel to click a link will open that URL in a new tab. And if you find that your scroll wheel's default setting scrolls too many lines at a time in certain sites, the ALT-SCROLL combo scrolls one line at a time for more precise control.

Registry Tweak Of The Month

When you right-click a file in Windows Vista, is your context menu cluttered with shortcuts you never use? Third-party disc burners, virus scanners, and other utilities tend to plant these links when you install the program, whether you want to use them from the context menu or not. To remove these pests, go into Regedit and find the key HKEY_CLASSES_ROOT\Directory\Background\shellex\ContextMenuHandlers. Look for the subkeys that are obviously named by these third-party programs. Deleting the relevant subkey will remove the context menu element.

password. Once inside LogMeIn, simply choose the PC you want to access in your network and click Remote Control. But before doing this, let's maximize the usefulness of this free service by going into the Preferences option and the Remote Control Settings section. Here, make sure Automatically Disable Wall-paper is checked. This will speed up Desktop viewing on the remote system. One of the things you give up in the free version of LogMeIn vs. paid versions of this and other software is the ability to transfer files easily from a host to a remote computer. One work-around for this is to activate the clipboard transfer service. This function transfers whatever you copy on the host PC to the remote clipboard. In the Automatic Clipboard Transfer Maximum Size setting, use the maximum setting of 16384, which will let you block and copy a fairly large amount of text on the host and paste it into a word processor on your remote computer.



Remote Control

General Settings

Use mirror display driver: ☑
Automatically disable wallpaper: ☑
Automatic clipboard transfer maximum size: 16144 KB (min: 1, max: 16384)
Idle time allowed: 0:00:30:00 (D:HH:MM:SS, min: 10s, max: 24h)
Auto panning: ☑
Default Remote Control: ActiveX
Control-Alt-Del Hotkey: Control-Alt-Insert

Security

Disable host keyboard and mouse: ☐
Blank the host's monitor: ☐
Lock console when connection broken: ☑
Lock console when connection times out: ☑
Always lock console when remote control disconnects: ☐
Local keyboard & mouse takes precedence over remote: ☑
Allow one click login to desktop: ☑

LogMeIn Free remains the best bargain in remote access. Most of the basic functions of using your home PC from afar are available here at no charge.

When you log in to your host PC, there are a few tricks that will optimize speed. First, in the LogMeIn screen, click the Full Screen option to fill your remote screen. If you really don't need to see your host display in color, you can accelerate performance substantially by clicking the Color Quality icon and choosing Fastest. This will turn your view of the host Desktop to black and white, but it will be much faster. Another trick is to lower the host PC resolution, which usually runs higher than a remote laptop. Go to the Resolution Settings icon and use the Match Resolution option. Finally, go into the Options menu and make sure that the Sync Clipboard option is checked. Now you can copy text from the host screen and paste it into an application on the remote PC.

Look At This!

Most Web conferencing and remote access services will let you share your Desktop screen with others to show presentations and demo applications. But the new YuuGuu (www.yuuguu.com) beta lets you do this for free. Download the client to your host PC and have your colleagues download a copy of the client to theirs. Like an IM client, the YuuGuu program shows you who is present and available. When you click a contact and offer to share your Desktop screen with him or her, it pings them to accept the invitation.

YuuGuu has several cool features. Once the image of your PC is up on your buddy's Desktop, he can request control of your screen by clicking the Request Control button. If you agree, then the remote user can show you things on your Desktop. Also, at the top of both screens, YuuGuu provides a call-in number and a common PIN. In the U.S., the service is free (long distance rates still apply), but it lets you talk to one another through a demo or presentation. YuuGuu can be sluggish, so make sure you use the Faster option on the top of the host PC screen. This will lower the color quality but accelerate the rendering considerably.

From IM To SMS

Having access to your IM services and buddy lists from anywhere is easy enough at Web-based aggregators such as Meebo.com. If you're working on someone else's computer, it's always safest to use a Web service rather than download a client that may clutter the PC or leave your login info behind. One of the more versatile Web services is AOL's own AIM Express (www.aim.com/aimexpress.adp). Logging in to this service opens up separate windows that look and feel like a Desktop client. But AIM Express' best feature lets you communicate from the Desktop to a buddy's phone via SMS. Use the Actions button to add a new buddy. In the IM section, add +1 followed by the cell phone number of your friend. Then choose a Display Name and designate that this is to a Mobile Device in the drop-down menu. Once you save it, you can double-click this mobile buddy in the AIM list and immediately send a text message to them from the Desktop. What is exceptional about the AIM and AIM Express method is that the correspondent can talk back to your IM by answering the SMS. In effect, you can have a text chat from IM to SMS. ▲

by Steve Smith

Infinite Loop

Six botnets, 85% spam

We didn't know that email spam had a "market share", but it turns out that 85% of those unsolicited emails you're receiving come from a mere six botnets named Srizbi, Rustock, Mega-D, Hacktool.Spammer, Pushdo, and Storm. Botnets with a large market share are more likely to attract the attention of those fine, wholesome retailers who prefer to sell their goods via spam than more conventional means. Looks like the spam industry is a more competitive marketplace than we imagined.

http://arstechnica.com/news.ars/post/20080305-six-botnets-churning-out-85-percent-of-all-spam.html

Warm Up To Penguins

Fort Apache: The Server

Linux has two faces it shows to the world. The one we talk about most often here is the desktop and what you can do with it. But long before people thought about desktop use, Linux and its forebearer Unix were server OSes extraordinaire. And although the average home user is unlikely to need to set up a Sendmail daemon or use Named to serve DNS requests, there are a few services that may be worth installing or turning on.

A big one is Httpd, the Apache Web server. There are a number of good reasons to run a Web server on your Linux box. For one, if you host a Web site on a remote system, you can use a local Linux box running Apache to test it out. Once you have Httpd installed, you can also learn how to write Perl, PHP, Ruby, or Java Web services, among many others. And there are lots of useful packages, from blogging systems to calendar servers, which run on top of Apache. You can even set up a shared calendar for your family using Apache.

Depending on the options you selected when you first installed Linux, you may already have Apache installed. Still, it never hurts to check. The worst thing that will happen is that you'll be told Apache is up-to-date. As always, details differ for difference distributions, but the general ideas are the same. This time around, we'll be using Ubuntu 7.10.

If you open Synaptic Package Manager, you can easily find the apache2 package (it's right near the top of the list). Clicking this will install Apache. Synaptic will inform you that a number of other packages need to be installed, as well, which is fine. Apply the request and sit back.

Once you've installed apache2, you'll see that it's actually up and running. By default, Apache is added to your /etc/init.d directory, which means it's going to launch every time you boot the system. You can see this by opening up a browser on the Linux system and typing **http://localhost/** as the URL. Because we don't have any content yet, all you will see is a fairly boring directory listing.

Let's begin by creating a welcome page. The root directory for your Apache content is /var/www, and if you look there now, there's not much to see:

```
james@james-ubuntu-test:~$ ls -F /var/www
apache2-default/
```

If you're curious, apache2-default has a single file in it, which displays the string "It Works!" if you browse to it. We're going to create an index.html in /var/www itself. As shipped, if Apache looks in a directory and sees a file called index.html or index.htm, it will grab the contents of that file and return it if only the directory is specified in the URL. So when we navigate to http://localhost/, Apache will see that there's no file name specified in the URL. As such, it will look in the directory for an index file. If it finds it, it returns that. If not, it simply returns a directory listing. You can actually configure Apache to generate a 404 error instead. This isn't a bad idea: Letting people see your server's directory listings is a *bit* of a security hole.

Speaking of security, we want to fix the permissions on /var/www. With Ubuntu 7.10, the directory and all the files under it are owned by root:root (user root, group root). The Apache server itself runs as www-data:www-data, for security. The www-data user and group should have been added during the install. We want to do three things: add a group called "www" and add ourselves to that group; change /var/www's ownership to www; and make any files created in the /var/www directory or its subdirectories group-writable.

Here's the logic. We want to be able to edit files in the content hierarchy without having to be root, but we don't want the Web server itself to be able to modify the Web content. If it could, someone could exploit the server and place infected files on our Web server. So by making the directories be owned by a group different from the one that the server runs as, but that we are a member of, we're protected.

The actual set of commands is fairly simple:

```
$ sudo addgroup www
$ sudo adduser <yourname> www
$ sudo chgrp -R /var/www www
$ sudo chmod -R g+w /var/www
$ sudo chmod g+s /var/www
```

These commands do the following, in order: add a www group; add you to that group (replacing <yourname> with your username); recursively change all the files and directories under and including /var/www to be group-writable; and set the “sticky” group bit on /var/www, which says that any files or directories created underneath it should receive www as their group.

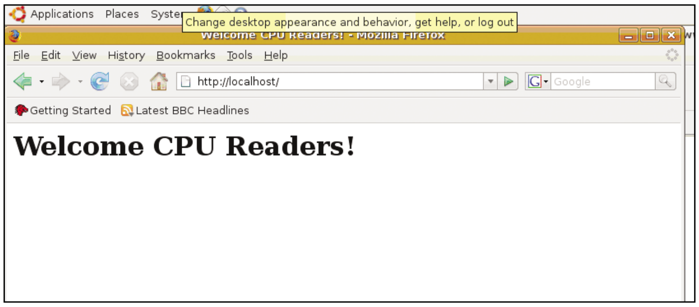
Now we’re ready to actually author some content. First, you have to log out and log back in again to access the www group added to your user settings. Fire up an editor of your choice (even a text editor will do) and save the following to a file called index.html, which you’ll save into /var/www:

```
<html><head>
<title>Welcome CPU Readers!</title>
</head>
<body>
<h1>Welcome CPU Readers!</h1>
</body>
</html>
```

Now if you point your browser to http://localhost/, you should get a friendly greeting. If all you want to do is create static Web content, you’re all set. Create files in /var/www or in subdirectories you create, and you can access them via URLs. And anyone on your local LAN should be able to access them, as well.

Just for fun, let’s finish off by writing a little perl program to generate some Web content. Create a new file in the /var/www directory called counter.cgi. It should have the following content:

```
#!/usr/bin/perl
print “Content-type: text/html\n\n”;
print “<html><head><title>I’m a
program!</title></head><body>”;
for ($a = 0; $a < 10; $a++) {
print “This is line $a<br/>\n”;
}
print “</body></html>”;
```



Change desktop appearance and behavior, get help, or log out

Welcome CPU Readers! - Mozilla Firefox

Welcome CPU Readers!

Once Apache is installed, creating static content is just a matter of creating an HTML file.

Now make it runable by turning on the execute bit

```
$ chmod a+x counter.cgi
```

If you browse to http://localhost/counter.cgi, you’ll get a nasty surprise, however. Instead of the program running, you’ll get the contents of the file itself. This happens because CGI scripts have not been enabled. Letting random programs run can be a security risk, so you have to explicitly permit it.

In the current release of Apache, you can find the configuration files in /etc/apache2. In older versions or different releases, you may find them in /etc/httpd. The structure of the directories and files underneath varies from version to version, so we’ll describe it for Apache 2.2.4.

In 2.2.4 under Ubuntu, there’s a directory in /etc/apache2 called modules-enabled. This has the software and configuration files for the Apache modules you’ve enabled. You can enable new features by copying files from the modules-available directory to modules-enabled. To turn on CGI, start by editing the file called mime.types. Look for this line “#AddHandler cgi-script .cgi” and remove the “#.” Then save the file.

You also need to set a flag on the directory itself, you can find the configuration options for the “default” Web site in /etc/apache2/sites-enabled; it should be called something like “000-default.” Find the line that reads “Options Indexes FollowSymLinks MultiViews” and tack “ExecCGI” to the end (with a space between”MultiViews” and “ExecCGI.” Then, save the file and restart the server by typing **$ sudo /etc/init.d/apache2 restart** in the console. If you did everything right, you should be able to open http://localhost/counter.cgi and see Apache counter from 0 to 9. ▲

by James Turner

Infinite Loop

Where There’s Smoke, There’s Horseradish

A fire alarm works great . . . if you can hear it. But what if you’re hearing-impaired? Bypassing what seems like the obvious logical choice of substituting bright flashing lights for a piercing screech, researchers at Japan’s Shiga University have developed a system that disperses the pungent aroma of horseradish to rouse the sleeping in the event of a fire. In a recent test, 13 of 14 subjects woke within two minutes, declaring their amazement at the device and a profound hunger for yellowfin tuna sashimi.

Source: www.wctv.tv/APNews/headlines/16188567.html by Mike Magee

Splitting The Atom

Intel's Silverthorne chip had just been rebranded the "Atom" as we started to write this column.

More properly, it's called the Centrino Atom, and this all poses a dilemma for Intel and for its customers, too. We know that because for the last 10 months or so, Intel has watched its unlikely competitor, Via, snap up deals with customers to make 7.5-inch form factor machines.

Intel says the Atom is a low-wattage chip based on the Core 2 Duo instruction set that uses a 45nm core and will clock at up to 1.8GHz. And strangely enough, although Intel says Atom is an entirely new microarchitecture, the chip will include HT (Hyper-Threading) technology.

Although apparently there will be some design wins for this product coming in the second and third quarters of this year, the Atom comes in behind Via. Via was best known for its chipset designs in the past, but over the last two years has shown off a number of x86-based processors which are incredibly small. It hasn't made a song or dance about these, but even if much of the world hasn't noticed, Intel certainly has.

We've said before in these columns that we like very portable machines, and PCs based on Via and in the future Intel reference designs are attractive if you're one of the people like me that don't like toting around a variety of wires and a heavy bag that slows you to a stop.

The machines have to have the ability to access different types of networks including Wi-Fi, 3G, and other cellular meshes, and that's true of some of the Via reference machines we've seen, while Intel promises the same for customers that take up the Atom. Intel is apparently insisting that its own wireless chipsets must be used in designs made by its notebook customers.

These machines also have to be affordable and somewhat flexible. With the prices of notebooks continuing to plummet, there will be some hard decisions for Intel's OEM partners to make, positioning any Atom-based machines against their regular offerings with better screens, faster processors, and, generally speaking, more features.

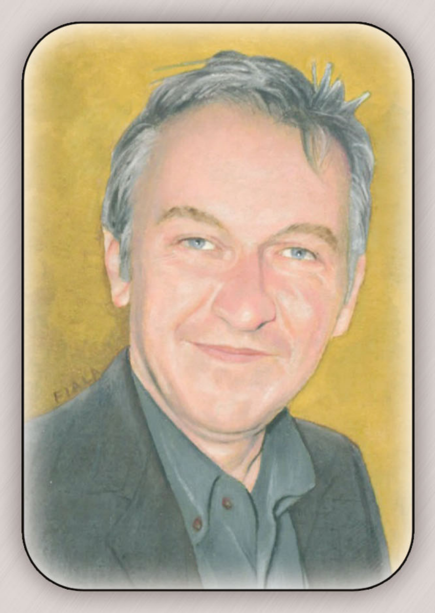
One of the primary constraints, according to sources we've spoken to, is that Intel is insisting there will be very few ways (that is to say, through expansion slots) to add to the basic spec. If this is true, then it's a mistake.

The inclusion of HT on Atom really is something of an oddity. A few years ago, the only way Intel could make its Pentium 4 Prescott designs sexier was to introduce Hyper-Threading. We may be wrong about this, but there are in fact very few applications that make use of Hyper-Threading, aside from some very high-end graphics and CAD applications, which you certainly wouldn't want to be using on a machine with a 7.5-inch screen.

While the battle goes on between Via and Intel for market share on these so-called MIDs, or mobile Internet devices, it seems that the big surprise is that the second-largest x86 player, AMD, is completely left behind. It has vaguely hinted at such plans, but surely it is rather surprising that Via, a company that barely gets mentioned as a serious player in the PC market, should be something like a year ahead of Intel.

Via, for reasons best known to itself, tends to codename its future projects after Old Testament prophets, and we understand that Intel is very keen to know what the Taiwanese firm has up its sleeves in the future. The word is that it continues to shrink its microprocessor and concentrate on even less power usage, along with increasing the flexibility of its reference design.

This all leaves those of us hungry for a highly portable machine faced with choosing at some point between Via and Intel. I'm looking forward to reading reviews of Intel Atom-based machines, and to seeing just how reliable they are in the field, how long the juice lasts for before you go hunting for a way to charge them, and how good their displays look. ▲



Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

Send rumours to "Mad Mike" Magee at mike@cpumag.com

by Rahul Sood

Games For Your Mom

Last month in this space, I wrote about my own confusion surrounding Games for Windows. We had a meeting with Microsoft at GDC, and while they still face challenges, it does seem that they are dedicated to making good on their initiative based on what they said at the meeting. Whatever it is that Microsoft is trying to do, we're all in agreement that the PC Gaming experience needs to be improved.

Speaking of improving PC Gaming, a group of us had an interesting meeting with the WildTangent team during GDC. As many *CPU* readers know, Alex St. John, the widely known "father" of DirectX, is the CEO of WildTangent and also a regular *CPU* columnist. I have always liked Steam's approach to digital downloads, and their DRM system is pretty well managed. I always have thought that Gabe Newell is a genius, and when I heard that Alex St. John felt he had a good alternative to Steam, my interest piqued.

I always thought WildTangent was about making games easier for my mom to play, and as much as I like looking at Bejeweled, I can't see myself playing it until my 50th birthday.

Well, surprise, surprise, Alex's team has been working on a really cool core gamer module that will allow you to play AAA gaming titles (think Company of Heroes or Call of Duty 4) free with ads or on a pay-as-you-go basis. You can even choose to buy the game outright if you'd like and have it downloaded directly to your PC so you can start playing immediately.

The way it works is simple: You log in to your game software and, using a standard gamepad or mouse, you choose a game from a list of titles. If the game is already installed, you may choose to play it. Otherwise, you can cue it up for a download to play later.

Sounds a lot like Steam, right? Not quite. The cool thing about this software is you don't have to buy the game in order to play it. You can choose to either watch an ad from a sponsor (if there is currently a sponsor) or pop a few virtual WildCoins in to play. WildCoins are the currency WildTangent developed to facilitate its pay-for-play system on casual games, and now they're alluring to hardcore gamers, as well.

Another way to look at this is you no longer have to worry about spending $50 on a game that sucks; you can play it for $1.50 until you close the application. Or if you prefer not to spend any money you can choose to watch an ad for a particular sponsoring product prior to playing and then play. For those of you who prefer to buy the game outright, WildTangent also gives you the option just to buy it and download it to your hard drive.

So it's cool to see dedication like this in the PC space, and it gives me big hope for the future—a future where PC gaming should be as easy as consoles, yet deliver the richness you can only get on a PC. That said, the more we try to port console content to the PC, the greater chance we have of killing the creativeness of developers.

Now, who was it who said that PC gaming is dying again? Make no mistake: PC gaming is growing. It grew last year and the only thing that's changing is the distribution model. WildTangent is definitely doing some wild things, and as long as the gaming experience on the PC gets easier, I'm all for it.

This brings me to the PCGA (PC Gaming Alliance) announcement at GDC. I was representing HP for our PCGA "go or no-go" decision, and since the announcement, people have been asking why we chose not to become a founding member.

While we believe it's important to make PC gaming easier, we don't believe that PC gaming is in trouble, and perhaps once we work out our own plans in the performance PC space, we'll revisit this initiative. For the moment, I'm still enthusiastic about the future. ▲

Rahul Sood's love for computers started at the young age of 11. Much to the shock and dismay of his parents, he ripped apart his brand-new Apple //c and painted it red before turning it on. His parents' dreams of having a doctor for a son were shattered when college drop-out Rahul founded what is now one of the most respected high-end computer companies in the world, Voodoo Computers.

Send your opinions to this opinionated guy at rahul@cpumag.com

CPU

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abattoir.net

04.05.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

Maximum Overkill, Binghamton, NY
core.binghamton.edu/maxover

Plan 9, Kalamazoo, MI
www.whatistheplan.com

04.11.08
FragFest, Utica, NY
gamers.sunyit.edu

LAN OC, Ohio City, OH
lanoc.org

Netwar 15.0, Omaha, NE
www.netwar.org

04.12.08
Jacksonville Gamers April Event, Jacksonville, FL
www.jaxgamers.com

LAN Party Extravaganza, Hamburg, NY
www.lanpartyextravaganza.com

04.18.08
Dfragmentor, Lakewood, CO
www.FNFF.net

04.19.08
Appalachian State University Gaming Club, Boone, NC
www.gaming.appstate.edu

BYOC LAN, Williamsport, PA
acm.pct.edu/byoc

MELTDOWN '08, West Henrietta, NY
remote.lanaddict.com:8080/egslan

NEARFF, Searcy, AR
www.harriscustompcs.com.nearff

Overkill LAN Party, Tampa, FL
www.overkill-lan.com

Whempy's LAN Party, Columbus, OH
whempyslan.org

04.26.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

04.26.08
n00bapalooza 4.0, Manlius, NY
n00bapalooza.freehostia.com/joomla

Spring 08
Xodus, NY
www.egslan.com

05.02.08
ALL Your Base Lan, Winnipeg, Manitoba
www.allyourbaseonline.com

05.10.08
Whempy's LAN Party, Columbus, OH
whempyslan.org

05.17.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

South Oakland County Lodge 130, Ferndale, MI
www.fop130.org.index.html

05.22.08
PAGLAN 11.NVGA SuperCON, Albuquerque, NM
www.nvgasupercon.com

05.26.08
NEXLAN, Spokane, WA
www.nexgenconsulting.net

05.30.08
Traverse City Fragfest 13, Traverse City, MI
www.fragfest.cx

05.31.08
OnTargetLan, Hot Springs, AR
www.ontargetlan.com

06.01.08
FragFest, Traverse City, MI
www.fragfest.com

06.07.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

06.20.08
FGA LAN 2008, Marion, IL
www.clanfga.com

06.21.08
Intel LanFest: Sacramento, Grass Valley, CA
lanfest.intel.com

PeaceLoveandRockets, Arlington, TX
www.peaceloveandrockets.org

06.21.08
Whempy's LAN Party, Columbus, OH
whempyslan.org

07.18.08
PDXLAN 12, Portland
www.pdxlan.net

07.19.08
LAN Stanley, San Antonio, TX
www.myspace.com.lanstanley

Whempy's LAN Party, Columbus, OH
whempyslan.org

07.24.08
Fragapalooza, Edmonton, Alberta
2007.fragapalooza.com

07.26.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

08.07.08
Dark LAN, Euclid, OH
darklan.thedarkserver.com

08.16.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

09.01.08
LAN OC, Ohio City, OH
lanoc.org

09.06.08
LANmaniac BYLOC LAN Party, Bellflower, CA
www.lanmaniac.com

10.10.08
Necronomicon, Plan City, Florida
www.seads.org.LANParty.necrolan.htm

11.07.08
ALL Your Base Lan, Winnipeg, Manitoba, Canada
www.allyourbaseonline.com

12.31.08
LAN OC, Ohio City, OH
lanoc.org

02.07.09
Carolina Games Summit, North Carolina
www.CarolinaGamesSummit.com

04.01.09
Arkansas LAN, Arkansas
www.arkansaslan.com/index.php

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Technically Speaking

An Interview With CASPIAN Founder Katherine Albrecht

Katherine Albrecht is a consumer privacy expert, which she defines as "someone who pays attention to the risks that consumers run when they go about their regular business." She is the founder of CASPIAN (Consumers Against Supermarket Privacy Invasion and Numbering), a consumer watchdog group with over 15,000 members in all 50 states and 30 countries. She holds a Doctorate in Consumer Education from Harvard University and regularly testifies on consumer privacy issues before lawmakers around the globe. Her syndicated, daily radio show streams live on WTPRN.com, Monday through Friday from 10 a.m. to noon, Eastern. ▲

by Barry Brenesal

CPU: Katherine, when we last spoke with you two years ago, the focus was on the anti-RFID movement. But privacy campaigners have now broadened their concerns beyond this, haven't they?

Albrecht: Yes. There's been a real sea-change in the way privacy is perceived, with the U.S. government making greater demands for access to private sector transactions and databases. In the past, the government held itself—to some extent—to Constitutional restrictions on its ability to poke around in people's private business. As the ACLU has aptly pointed out, the government has long relied on the private sector to collect data on the public; then it would put in requests when it wanted something.

What we've seen happening in the last couple of years, however, is a cutting of pretense, a sort of "Why even bother pretending as though we weren't getting the data? Let's cut right to the chase." The government is now getting involved in a much more overt and much less secretive manner in obtaining people's private information. This has held true for everything from wiretaps that listen to your phone calls, databases that let the federal government scrutinize employer-employee relationships, and a plan to force airlines to request federal permission before letting you fly from Boston to Phoenix for your sister's wedding. That kind of interest has not been something that the government has openly acknowledged in the past.

CPU: So it's not just an electronic invasion of privacy, but the passing of laws that permit the electronic invasion?

Albrecht: It's a combination of both. The government doesn't need to pass laws for a lot of the privacy invasion it is already doing. This ties back to when I first started CASPIAN in 1999. What motivated me to become a privacy advocate was realizing I had a wallet full of plastic cards that I was using for virtually everything I did, whether it was to go to the library, buy groceries, or get on the bus. Then it occurred to me that every one of those plastic cards represented a database of information being kept on me, that every transaction I made was being carefully recorded in a database somewhere.

That was not the case 15, 20, 30 years ago. It used to be impossible for companies to retain that kind of information, or even if they could, it would be stored in a warehouse so big—file cabinets stacked up to the rafters—you could never go through it and find what you wanted in a way that could effectively invade somebody's privacy. But all that data is now ripe for the picking, and the government is one of the main customers.

CPU: Surely the corporations doing this today would say that by storing this information, they can easily recover data as needed, upon request.

Albrecht: But companies are recording information that is invasive of your privacy, and it's not necessarily for your benefit. One example everyone can relate to is phone records. When you make a phone call, you need to let the phone company know what number you're dialing so they can place the call and bill you accordingly. We all know we're going to share that information with the phone company when we make the call. But the fact that they keep a record of those calls long after they've been paid for is actually a relatively new concept. Now there are databases that allow the phone company to go back and ask, "Whom did you call five months ago? Eight years ago?" When was the last time you asked the phone company who you called eight years ago? That's not data that needs to be kept, when the ostensible reason for collecting the data was simply to bill you. It doesn't add up.

People who are reading this are probably thinking, "What's wrong with that?" But the point is that this is a significant change from the way things were done in the past, and it has huge privacy implications. There is almost an expectation now on the part of society that every transaction we make will be recorded and made available to somebody who down the road who wants to go on a fishing expedition and look into the private details of your life.

CPU: Is there any rationale in your opinion for a company keeping five years, 10 years worth of data on a customer?

Albrecht: I don't think there is. That's the question I'm looking at nowadays, and it isn't being discussed as openly as it should be. Once something has been paid for, your involvement with that company, and its involvement with your data, should end. Let's say, for example, that I'm using a credit card. (Though I should point out parenthetically that I don't use credit cards.) I make multiple purchases, go to a restaurant on Saturday evening, and you can tell from the amount I spent there that I paid for four people. Let's say that I charged some movie tickets on that card. I then went into an expensive department store, and there was a $200 charge in there. You could piece together, based on those credit card charges, a pretty accurate view of my lifestyle, where I've gone and what I've done. That's very lucrative for the credit card company to hold onto for a variety of reasons, but I didn't engage in those transactions so the credit card company could scrutinize my life. They were providing a service to me for which I pay them handsomely, in the form of interest and fees. But I didn't do those things in order to create a data trail.

So what is the solution to the big privacy problem we're facing? It's looking at the data-retention policies of these companies. There is no reason for them to retain my information after I've bought and paid for the item and paid them for their services.

But companies are recording information
that is invasive of your privacy,
and it's not necessarily for your benefit.
—Katherine Albrecht

CPU: Suppose they reply that they need to keep the data in case purchases are applied against tax return statements?

Albrecht: That's where you get into trouble. Because the government would love for these companies to retain information not only about your taxes, but everything else you do, too. The big question, though, is whether it is a corporation's proper role to retain information about you on behalf of the government, or should the government have to go through proper channels involving you directly if it wants your data? This recent concept that it's a company's job to make sure we obey the law is very troubling. We're hiring them. We're paying them. They work for us, in a sense. Your credit card company is your employee. You're paying them in order to make transactions for you.

CPU: But back to taxes. From your perspective as a consumer, suppose you make a claim on a federal return that you made purchases on a certain date for your business? Don't you need the credit card company to back you up?

Albrecht: There was a time when I could make a purchase at Trader Joe's and I would get a receipt with nothing on it but a series of prices. It would then be my responsibility to photocopy that receipt and provide it to my accountant if it was relevant to my taxes. It was not Trader Joe's responsibility to itemize and list out exactly what I bought and store that information in a big database somewhere for the government to peruse later. The idea that somehow our word is not good enough and now we require these massive third-party databases to back up the claims we make to our servant government is a big part of the problem. Do we really want that level of scrutiny? Do we really want to be that subservient to our own institutions?

It also brings up the Fifth Amendment that, among other things, protects you from testifying against yourself. I had a conversation with somebody recently concerning black boxes in automobiles that record driving data and can be used against you in court. But why should you have one of those things in your car? You own the car. You paid for it; it's yours. It should not testify against you in the case of an accident. But all of these technologies—the databases of information, the technological gadgets in our lives— keep moving in ways that are increasingly keeping tabs on us. In nine cases out of 10, they're doing so in order to use it against us.

CPU ONLINE

Subscribers can read bonus content with Katherine Albrecht
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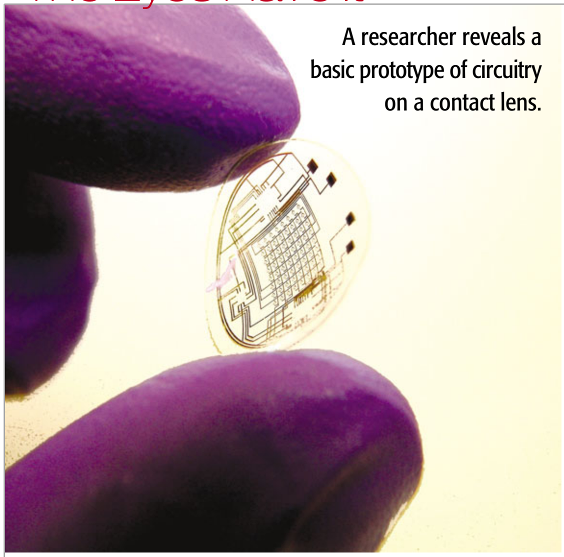
by Kristina Spencer

Under Development

A Peek At What's Brewing In The Laboratory

The Eyes Have It


A researcher reveals a basic prototype of circuitry on a contact lens.

Bionic eyes—no longer the fodder of cheesy '70s TV, or indeed, current cheesy remakes! A real prototype nearly worthy of Steve Austin has been developed by a multidisciplinary team lead by Babak Parviz (assistant professor of electrical engineering) at the University of Washington, using microscopic manufacturing techniques to imbed imprinted electronic circuits and lights in contact lenses.

Parviz and his team are focusing on two main applications for the device: virtual displays and biosensors. Imagine popping in your contact lenses and diving into your favorite videogame or carrying your GPS in your eyes instead of your pocket, making that geocache search a much more interesting experience.

The lenses are flexible and as safe and easy to insert as any other contacts. The electrical circuitry was developed on the nanometer level, making the circuits only one-thousandth of the width of a human hair. Red LEDs, which do not yet light up in the prototype, used for the display are only one-third of a millimeter across.

The components pull together by self-assembly. With this technique, each micropiece is created in a particular shape that can only fit into another appropriately-shaped piece, forcing the pieces to come together in a particular fashion. Once in place, none of the lights or circuits will affect or obstruct a user's vision: Parviz notes that there's room on the lens to place instrumentation outside a user's view.

The device won't be completely hands-free, at least for quite a while. "Eventually the user might have to use a handheld device of some sort to control the display," says Parviz. "A very advanced version can incorporate voice command."

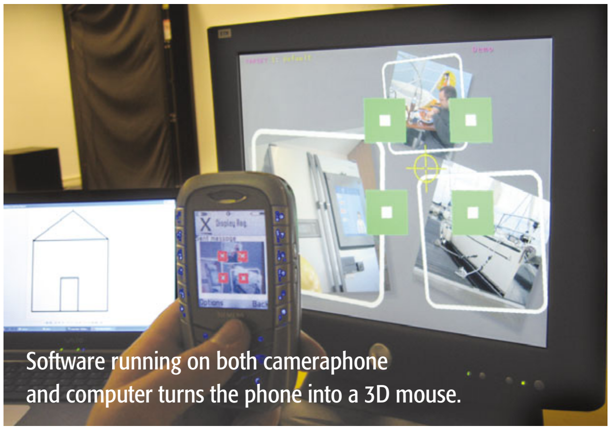
Plans for powering the system include using a combination of solar cells and RF power stored on the lenses.

Still in the early stages of development, don't expect these lenses on the market any time soon. But when they do arrive, Parviz assures that they'll be able to insert the device on corrective lenses, too, so you can get your 20/20 vision to go with those bionic eyes. ▲

Talk. Point. Click.

Though it's getting harder to remember with each passing month, there was once a time when you used your cell phone for just one thing: making and receiving calls. Quaint, eh? Nowadays, you can use it to manage your calendar, check email, surf the Web, take photos, listen to music, and yes, still make a phone call when the mood strikes. And researchers in the United Kingdom are looking to add yet another function to these do-it-all devices: 3D remote control.

Nick Pears of York University, along with Patrick Olivier and Dan Jackson of Newcastle University, have developed software that lets a cameraphone interact with items on a computer screen simply by moving the phone around in front of it. It behaves similarly to Nintendo's Wii controller, which allows for wireless motion-sensitive control of videogame play. But the similarities end there.


Software running on both cameraphone and computer turns the phone into a 3D mouse.

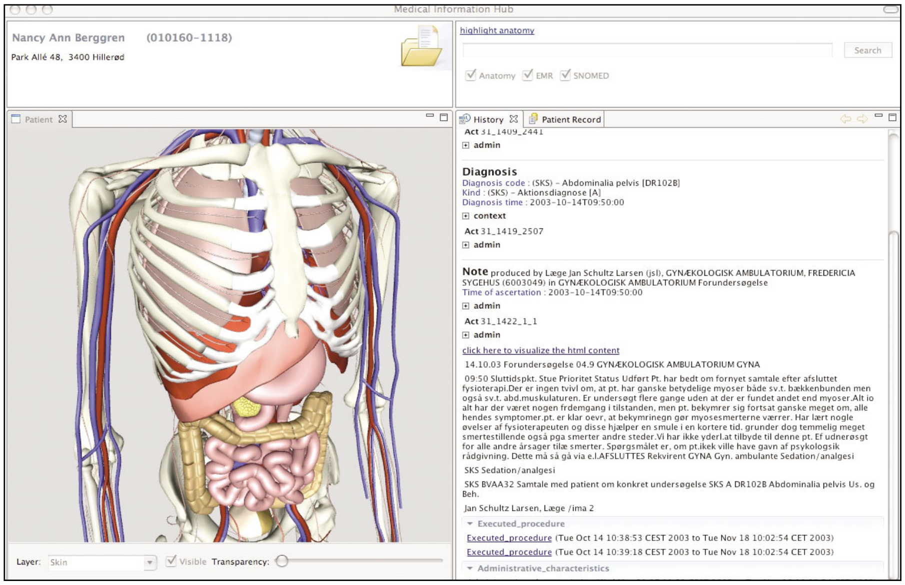
Software that runs the phone looks for bright green pixels generated by the software that runs on the video screen. It then uses the green pixels to link the position of the phone to the screen via a Bluetooth connection. The PC then computes the relationship between the phone and the computer so that it knows which part of the screen the cameraphone screen is pointed at.

"Once we have this correspondence, anything is possible," explains Pears. "For example, if you have a touch-sensitive phone screen and point and click on the phone screen, that action is echoed by the correct click on the PC screen."

The researchers believe the technology has great potential when it comes to interacting with large public displays, providing users an easy way to download information or complete transactions in a natural, seamless way.

Pears believes that with continuing advances in cell phone technology—faster processors, better image processing hardware, and higher bandwidth communication links—the software could be available commercially in two years. ▲

I Sing The Body Electronic



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Diagnosis
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Kind : (SKS) – Aktionsdiagnose [A]
Diagnosis time : 2003-10-14T09:50:00
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Note produced by Læge Jan Schultz Larsen (jsl), GYNÆKOLOGISK AMBULATORIUM, FREDERICIA SYGEHUS (6003049) in GYNÆKOLOGISK AMBULATORIUM Forundersøgelse
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14.10.03 Forundersøgelse 04.9 GYNÆKOLOGISK AMBULATORIUM GYNA

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ASME marries a patient's electronic medical records with 3D images of the human body.

If your visits to the doctor's office leave you frustrated and confused by medical jargon that just doesn't *speak* to you, you're not alone. And, if researcher Andre Elisseeff and his team at IBM's Zurich Research Lab have their way, you won't be feeling this way much longer. Elisseeff and his fellow researchers have created a program to assist doctors in working with their patients by presenting the patient's electronic health records in the context of a 3D image of the human body.

Called ASME (Anatomic and Symbolic Mapper Engine), Elisseeff describes this computer prototype as Google Earth for the human body: Doctors can click any area in a 3D image and access the patient's relevant information (such as lab results, medical images, and doctor's notes from prior visits) for that area. And as a visual tool, doctors will also be able to show patients exactly what's going on in their bodies while working on their diagnosis.

Beyond the cool navigational elements and indexed mapping to health records, there is an intensive back-end database of 300,000 medical terms as defined by the SNOMED (Systemized Nomenclature of Medicine) international standard.

The SNOMED terminology is what makes the mapping functionality of Elisseeff's invention contextual and accurate: It builds the connections between the visual objects and the ultimate medical knowledge. Elisseeff explains that the team uses SNOMED to "teach" the computer how body parts can be related to each other; how disease affects the body; or how one symptom may be related to another.

This pairing of deeper medical reference for doctors with visual references is what excites Elisseeff and his team most. They feel that this tool is one way to bridge the gap between doctor and patient; once patients see the tool in action, they will want it as a ubiquitous element of their healthcare.

"We cannot predict how the tool will be accepted before it's out in the market, but we pay a special attention to the patients while designing the system, as we believe they play a strong role directly or indirectly in the acceptance of IT among medical professionals," says Elisseeff.

The tool is expected to be ready by the end of 2008 for hospitals, but it's harder to predict when it will be available for the consumer market, because eHRs aren't the norm in the healthcare industry yet. An executive order was issued in 2004 to have the United States' health records computerized by 2014, but it is likely that date will slip. That said, Elisseeff feels, "it would be realistic to assume that an e-health portal could have such functionality [as ASME] by 2009." ▲

Stretchy Chips

We're used to hearing research news about the breakthroughs in making silicon chips smaller and circuits packed more closely together. But in the case of a group of scientists from Stanford, the big news is just the opposite: The team has designed a chip that can be physically stretched out many times larger than its original size. Prewired, stretchable chips cover large areas for far less than existing technologies, making them ideal for future use in large area sensors, solar panels, and big-screen TVs.

The chips consist of islands of silicon with coils of silicon wire around them; the islands can contain transistors, sensors, or other electronics. When the silicon is pulled, the chips expand and the coils unwind; what began as a densely packed configuration spreads into a widely distributed network. The current prototype stretches up to 50 times larger, but the team, led by electrical engineering professor Peter Peumans, believes that future iterations of the chips could expand thousands of times.

The great benefit of these stretchable chips is the cost savings potential for large area applications. Devices made with them would require less high-quality silicon, and the transistors or other devices embedded in them come already prewired. Peumans has already begun working with Boeing to create sensors that would monitor an airplane's structural integrity. His other current project is developing less expensive solar panels. ▲

Q&A With Andy Paul

CPU last caught up with Corsair president and CEO Andy Paul in the June 2003 issue. In the four-plus years since that interview, Corsair has continued to enjoy a leadership position among providers of enthusiast memory and has moved into some new product areas, as well.

Q **Corsair has historically focused largely on supplying products to the high-end PC enthusiast market. Has that market grown in line with your expectations, or has it surprised you a bit in terms of the number of builders and DIY upgraders?**

AP I'd say surprised, actually. I mean, we're growing at an average rate of about 50% a year, in terms of unit shipments, and as best I can tell we're about holding our own in terms of our market share position. Now, that's been pretty dominant since the very early days, but we seemed to have had the largest market share five years ago, and we still do, but my sense is that it's growing at about the same pace as we are, and we're going through some pretty big growth. Every year I have this notion that we're completely saturating the market, that there can't be any more people building machines at home. But there obviously are; we just broke through our first million-module month in January, so we thought that was a pretty good milestone. Shipments keep going up, and demand is strong.

Q **What parallels do you see between the current DDR3 market and where DDR2 was at a similar place during its maturation?**

AP Well, it's a completely different situation, actually. DDR2 offered quite a bit of performance increase over DDR1 very rapidly, and if you think back to the timeframe when DDR2 arrived, it was only available on Intel platforms. At the time in the enthusiast world, the processor of choice was the AMD Athlon. There came a time in late 2006 when AMD launched their DDR2 interface and Intel introduced their dual-core, and that switched the market almost overnight for us to DDR2. Very quickly prices were virtually at parity. At the moment DDR3 is not really being used by either enthusiasts or corporate America in their machines yet, and the cost of it is about what you'd expect a normal memory module to be. But because of the oversupply, DDR2 is about a third of what you'd expect the price to be. So you sort of have this weird situation where there's not a lot of real need—the current motherboards and chipsets don't offer a huge advantage with DDR3 over DDR2—and the technology is three times the price.

Q **Let's talk about power supplies for a moment. How's the PSU business treating Corsair?**

AP I'd say fantastically. I'd be so bold as to say that it appears that we could move into a very similar position that we're in with the enthusiast memory world with power supplies in relatively short order. And as you can imagine, the combination of enthusiast memory and enthusiast power supplies together just gives us quite a lot more leverage in the channel and strengthens the Corsair brand in the enthusiast's mind.

Q **New, high-end platforms seem to be demanding increasing power, what with dual-CPU support, 3-way SLI, and the like. How far do you see those demands increasing, and how far *can* they realistically increase given the limitations of current PSU technology and residential power constraints?**

AP Well, I think that residential power constraints are the issue. Once you take 15 amps out of a socket, you're pretty much done, so you're kind of limited in the U.S. to about 1,600W. Probably by the time this article appears, our 1,000W power supply will be out and will adequately handle most of the currently conceived demands of multiple-GPU systems. I would think somewhere between 1,000 and 1,500W is where you have to assume the market is going to peak, because there's a lot of pressure on CPU makers and graphics card makers to not increase power. So I think there the goal is to get more performance and less heat. But I'd say for the next year, all the high-end stuff is going to reside in 1,000W and above.

Q **Corsair's first PSUs had modular cable designs, but the two more recent lines (VX and TX) don't. Was this change the result of manufacturing partner changes, or was it a design decision, and if the latter, why did Corsair elect to go away from modular cables?**

AP There is a bit of a cost premium on offering modular power supplies, and in some cases that's warranted. In some of the value lines (the 450 is really targeted at a more budget-conscious user), we felt that we didn't want to include the modular option. Pretty much the way it will shake out in the future is that the premium, high-end supplies we want to go modular, and the lines for the budget builder will be nonmodular. There are some technical aspects of modularity; some people think that with really high-end supplies, you'd rather have solid copper to the connectors, so we have that to consider, as well, but in general that's the way we're playing it. ▲

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